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The Silent Crisis: Addressing Women's Burnout in Smallholder Dairy Farming Communities in Bangladesh

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ABSTRACT:

This research examines the complex interplay among environmental factors, home obligations, limited technological access, health concerns, workload demands, and burnout among women engaged in smallholder dairy farming. The research findings indicate a notable positive correlation between environmental factors and workload (H1: ENV→WL), household responsibilities and workload (H2: HR→WL), lack of access to technology and workload (H3: LAT→WL), health conditions and workload (H4: HLT→WL), and workload and women's burnout (H5: WL→BO). The study also discovered a significant positive link between the workload of women and their experience of burnout (H5: WL→BO). This observation was among the discoveries made in the course of the study. It was concluded that this assertion was really accurate. Throughout the duration of the study endeavor, compelling evidence was discovered, thereby substantiating five of the hypotheses that were investigated and subjected to rigorous testing. The aforementioned results highlight the imperative need for focused interventions and support systems to alleviate the feelings of fatigue among women engaged in smallholder dairy farming communities in Bangladesh. Bangladesh encompasses a variety of discrete communities within its territorial boundaries. Bangladesh encompasses a wide array of distinct communities within its territorial boundaries.

Keywords: Women's in dairy farming, Burnout, Smallholder Dairy Farming, Bangladesh.

1. Introduction

Smallholder dairy farming plays a significant role in supplying sustenance for a number of producers engaged in mixed crop-livestock endeavours in Bangladesh. The overwhelming majority of conventional dairy farms are characterized by a smallholder model, wherein the herd size typically ranges from 1 to 6 cows (Md. E. Uddin et al., 2022). The dairy milk production in Bangladesh mainly happens to be carried out by smallholder farmers, who contribute between 70 to 80% of the nation's total output. Currently, Bangladesh's per capita milk consumption is 52 grams per day (M. M. Uddin et al., 2011). The recommended daily amount of dairy milk for each individual, set at 250 grams per day, highlights the importance for an enormous boost in the country's milk supply (Neculai-Valeanu & Ariton, 2022). In the fiscal year 2022-23, the Department of Livestock Services (DLS) disclosed that milk production in Bangladesh amounted to around 14.07 million metric tons, whereas the expected demand for milk was 15.85 million metric tons (প্রাণিসম্পদ অধিদপ্তর, n.d.). As a consequence, there was a shortfall of 1.78 million metric tons, which corresponds to 11.23% of the overall demand (প্রাণিসম্পদ অধিদপ্তর, n.d.). The dairy business in Bangladesh exhibits considerable potential for expansion, and the utilization of contemporary technology can play a crucial role in helping to promote sustainable growth and achieving excess production.

The participation of women in smallholder dairy farming in Bangladesh has considerable importance, given that they represent a majority of the small-scale dairy producers within the nation (*The Digital Gateway to Empower Women Dairy Farmers*, 2023). The involvement of women in smallholder dairy farming in Bangladesh is significant due to their indispensable and diverse contributions. The individuals in question actively participate in multiple facets of the dairy farming process, encompassing tasks such as tending to the animals, providing nourishment, extracting milk, and overseeing the financial aspects associated with dairy-related operations inside the family. Moreover, it is worth noting that women play a crucial role in the processing and selling of dairy products, so making a substantial contribution to the overall sustainability and economic viability of smallholder dairy farms in Bangladesh. The participation of these individuals highlights the significance of acknowledging and aiding women's contributions in order to foster comprehensive growth within the dairy sector of the nation.

Burnout

Chronic physical and emotional exhaustion, cynicism, and unattachment from work are symptoms of burnout (Maslach & Leiter, 2016). Burnout causes people to feel overwhelmed, weary, and unable to satisfy job demands, which lowers performance and self-esteem (*Burnout: A Review of Theory and Measurement - PMC*, n.d.). Burnout can impair an individual's mental and physical health, in addition to their professional effectiveness (*Burnout in Mental Health Services: A Review of the Problem and Its Remediation - PMC*, n.d.).

Burnout in Smallholder Dairy Farming

Burnout in the context of smallholder dairy farming alludes to a condition characterized by experiencing feelings of emotional, bodily, and mental weariness resulting from extended exposure to stresses associated with the demands of the workload, health concerns, and economic circumstances (Kallioniemi et al., 2016). Research findings indicate that individuals engaged in dairy farming, especially women, face a considerable susceptibility to burnout, as seen by the prevalence of burnout among farmers and farm managers, which can

reach as high as 70% (O'Shaughnessy et al., 2022). The occurrence of burnout among smallholder dairy farmers can have detrimental effects on the general welfare of the farmers themselves, as well as their families and enterprises. This underscores how crucial it is to implement treatments and provide support systems aimed at preventing and effectively managing burnout in a setting like smallholder dairy farming (*IJERPH | Free Full-Text | Farmer Burnout in Canada*, n.d.). The productivity and workload of smallholder dairy farmers can be adversely impacted by many environmental constraints, including limited availability of feed and fodder, elevated costs of concentrate, and inadequate infrastructure (*(PDF) SMALLHOLDER DAIRY FARMING IN BANGLADESH: A SOCIOECONOMIC ANALYSIS*, n.d.). The allocation of household tasks, particularly among women who are responsible for managing both domestic and farm duties, presents a heightened susceptibility to burnout within the context of smallholder dairy farming. This phenomenon manifests as chronic stress and exhaustion, as these individuals strive to maintain a delicate equilibrium between caring for their families, attending to household chores, and actively engaging in dairy farming activities (Banda et al., 2021; Daghagh Yazd et al., 2019; N, 2022). The presence of technological constraints in smallholder dairy farming, as seen by the utilization of manual milking techniques and antiquated equipment, exacerbates burnout by augmenting the labour-intensive nature of many jobs, particularly for women. Consequently, this situation contributes to elevated levels of stress and tiredness (Fami et al., 2010; Gwambene et al., 2023; Lunner Kolstrup et al., 2013; Tittonell et al., 2005). The deteriorated health conditions observed in smallholder dairy farming, such as physical strain and exposure to agricultural hazards, play a key role in the development of burnout. These factors exacerbate stress levels and have a detrimental impact on overall well-being (Botha & White, n.d.; Evangelakaki et al., 2020; Younker & Radunovich, 2022).

Women's Burnout in Smallholder Dairy Farming

Women engaged in smallholder dairy farming face increased levels of burnout as a consequence of the simultaneous demands associated with managing domestic obligations alongside farm-related tasks, resulting in prolonged periods of stress and fatigue (*Frontiers | Well-Being at Work and Finnish Dairy Farmers─from Job Demands and Loneliness towards Burnout*, n.d.; Patil & Suresh Babu, 2018). The limited availability of technological resources and dependence on manual labour intensify their workload, hence amplifying degrees of burnout (Demerouti & Sanz Vergel, 2014; Mahudin & Zaabar, 2021). It is imperative to acknowledge and tackle the distinct obstacles encountered by women in these diverse jobs, since this is essential for enhancing their welfare and ensuring the long-term viability of the smallholder dairy farming industry (Giller et al., 2021; *Inclusive Growth - An Imperative for African Agriculture*, n.d.). Women participating in smallholder dairy farming in Bangladesh experience increased burnout due to the challenging tasks of managing their households and farm operations, leading to long-term stress and fatigue (Sraboni et al., 2014). The restricted availability of technical developments, such as manual milking techniques, exacerbates the workload of individuals, hence amplifying the increasing incidence of burnout. It is imperative to acknowledge and tackle these difficulties in order to enhance the welfare of women engaged in smallholder dairy farming within the context of Bangladesh (*Bangladesh Dairy and Beef vc Report (Wei's Final Version) .Pdf*, n.d.).

The intent of this study is to examine the correlation between Environment (ENV), Household Responsibility (HR), Lack of Access of Technology (LAT), Health (HLT), and Burnout (BO) in the context of women engaged in smallholder dairy farming. Additionally, this study aims to explore the mediating role of Workload (WL) in this relationship. The conceptual framework of the study which is proposed by the authors are is follows,

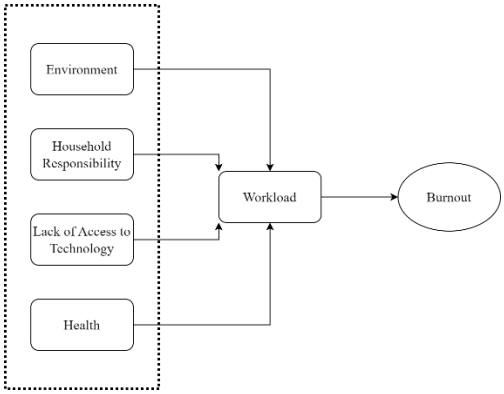

Fig. 1 Conceptual Framework (Proposed by Authors)

Hypothesis

H1: There is a relation between Environment (ENV) and Workload (WL) which is ENV → WL.

H2: There is a relation between Household Responsibility (HR) and Workload (WL) which is HR → WL.

H3: There is relation between Lack of Access to Technology (LAT) and Workload (WL) which is LAT → WL.

H4: There is a relation between Health (HLT) and Workload (WL) which is HLT → WL.

H5: There is a relationship between Workload (WL) and women's Burnout (BO) which is WL → BO.

2. Methodology

Data Collection and Selection

The study was conducted using a cross-sectional survey design, applying a quantitative research methodology and purposive sampling approaches. Purposive sampling is a qualitative research methodology that involves a non-probabilistic method of selecting a particular collection of individuals or entities for analysis (Nikolopoulou, 2022). This method intentionally selects participants rather than relying on random selection. Furthermore, it is possible for researchers to demonstrate that purposive sampling has the capacity to generate time and cost efficiencies (K. Black, 2023). In the aforementioned endeavour, a concise and focused questionnaire was distributed, and following a rigorous screening protocol, the investigator ultimately identified a cohort of 228 individuals involved in dairy farming to partake in the study. The data utilized in this study were gathered from various dairy farm establishments located in the vicinity of Dhaka, the capital city of Bangladesh. The researcher developed a survey instrument of 41 items in both English and Bengali languages. Out of the total number of items, ten items are related to demographic information, while the remaining 31 questions utilize a 5-point Likert scale. This scale ranges from 1, representing "Strongly Disagree," to 5, indicating "Strongly Agree."

On October 7, 2023, a total of 350 physical questionnaires were distributed to multiple dairy farms located around Dhaka City. These questionnaires were then collected on October 10, 2023. The questionnaires were distributed among the agricultural supervisors. A total of 267 questionnaires were obtained from the respondents, out of the 350 distributed. However, a total of 47 surveys were omitted from the initial sample of 289 due to incomplete responses. Furthermore, an additional 14 surveys were eliminated from the analysis due to the presence of apparent straight-line or questionable responses. The study achieved a response rate of 765.14%, which meets the minimum requirement of 50% stated by W. Black and Babin for surveys (W. Black & Babin, 2019).

Analysis Method and Tools

The data evaluation and interpretation were conducted using smartPLS version 3.2.8 (*Release Notes - SmartPLS*, n.d.). SmartPLS is a software program utilized for the execution of variance-based structural equation modeling (SEM) by employing the partial least squares (PLS) path modeling methodology (Sarstedt et al., 2020). Partial Least Squares Structural Equation Modeling (PLS-SEM) enables the identification of crucial factors and competitive advantages associated with important constructs such as customer satisfaction, loyalty, behavioral intentions, and user behavior (J. Hair & Alamer, 2022; Riou et al., 2015). The decision on the use of either covariance-based structural equation modeling (CB-SEM) or partial least squares structural equation modeling (PLS-SEM) should be determined by the particular research objectives at hand (J. F. Hair et al., 2021). For example, the use of CB-SEM is particularly appropriate for conducting research that seeks to forecast indicators through the application of component expansion methodologies. On the other hand, PLS-SEM is considered a more suitable option for conducting research that specifically aims to analyze the associations among observed variables (Astrachan et al., 2014; Dash & Paul, 2021; *PLS-SEM Compared with CB-SEM - SmartPLS*, n.d.).

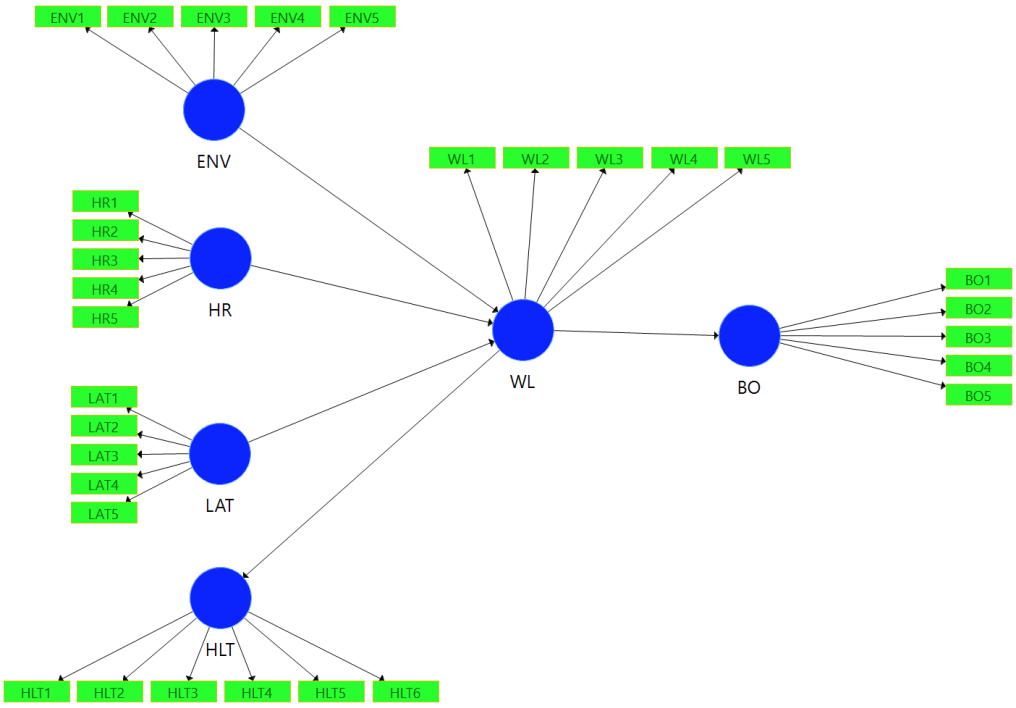

Fig.2 Conceptual Model in SmartPLS 3.2.8

3. Results and Findings

The study primarily focused on assessing independent variables to discover the key factor impacting women's burnout in smallholder dairy farming. In order to conduct the analysis, the study employed the PLS-SEM method, which was executed using the SmartPLS 3.2.8 software. This software is well-known for its proficiency in applying the PLS-SEM algorithm. The outcomes of implementing this technique may be observed in Figure 2, which illustrates the configuration of both the internal and external models of PLS-SEM. Furthermore, Table 1 presents a concise overview of the guidelines that have been produced from the analysis conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Table 1 Bootstrapping Parameters

Subsamples	500
Number of Results	Complete Bootstrapping
Test Type	Two Tailed
Significance Level	5%

Evaluating the Model

The relevant associations were found using SmartPLS 3.2.8, and the PLS-SEM algorithm with bootstrapping was utilized to provide a full grasp of the model. Upon completion of the construction process, a graphical depiction of the ultimate model was acquired, as illustrated in Figure 3.

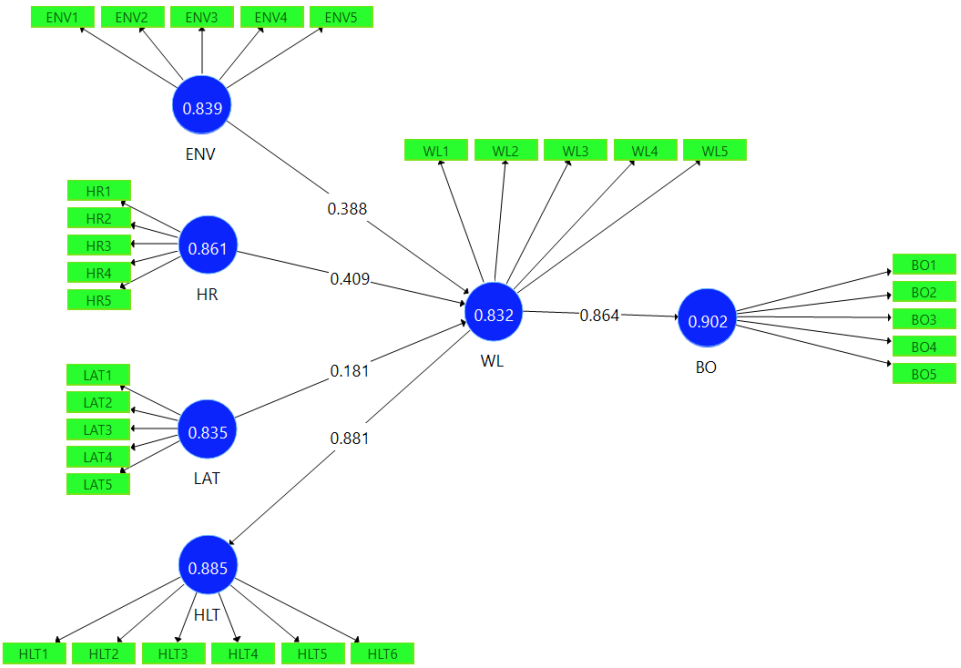

Fig.3 Conceptual model after PLS-SEM analysis

Convergent and Discriminant Validity

Convergent validity, which falls under the umbrella of construct validity, evaluates the extent to which a measurement aligns with other measurements that are believed to be measuring the same underlying construct. Put simply, it assesses the degree to which a measurement exhibits coherence with other measurements of the identical construct (Cheung et al., 2023). The aforementioned criteria play a crucial role in evaluating the quality of the measurement model in the context of PLS-SEM. The main goals of this study revolve around attaining a high level of dependability, which will be evaluated using established metrics such as Cronbach's Alpha (Forero, 2014) and Composite dependability (CR) (*The Cronbach's Alpha, Composite Reliability (CR), Average Variance...*, n.d.). Furthermore, the objective is to demonstrate convergent validity by employing the Average Variance Extracted (AVE) (dos Santos & Cirillo, 2023) for each latent construct. Of equal importance is the establishment of discriminant validity among these constructs, providing evidence that each construct effectively represents a unique part of the underlying theoretical framework. The thorough assessment of reliability and validity plays a critical role in guaranteeing the robustness and

accuracy of the measurement model, ultimately leading to more reliable and valid results in the PLS-SEM studies.

Table 2 Construct Reliability and Validity

	Cronbach's Alpha	**rho_A**	**Composite Reliability**	**Average Variance Extracted (AVE)**
Burnout	0.902	0.917	0.928	0.721
Environment	0.839	0.859	0.885	0.607
Health	0.885	0.905	0.913	0.639
Household Responsibilities	0.861	0.872	0.899	0.641
Lack of Access to Technology	0.835	0.902	0.881	0.602
Workload	0.832	0.868	0.883	0.606

Cronbach's alpha is a statistical measure used to assess the internal consistency reliability of a research instrument. It is generally accepted that values greater than 0.7 are indicative of sufficient reliability for the purposes of the study (Cheah et al., 2018). Composite reliability (rho_A) is an additional measure used to assess the internal consistency dependability of a construct. It is recommended that the value of composite reliability exceeds the threshold of 0.7 (*Usage of Rho_A Reliability Coefficient - Forum.Smartpls.Com*, n.d.). On the other hand, the Average Variance Extracted (AVE) is a metric used to evaluate convergent validity. It is generally considered acceptable if the AVE requirement is at least 0.5 (*The Cronbach's Alpha, Composite Reliability (CR), Average Variance...*, n.d.). The assessment of convergent validity for the scale involves the examination of the average variance extracted (AVE) and the combined reliability (CR) values. On the other hand, divergent validity is established by comparing the square root (√) values with the correlation coefficients among the different variables.

The Fornell-Larcker criterion is a technique employed by scholars to assess the discriminant validity of measurement models (Afthanorhan et al., 2021). According to this criterion, it is necessary for the square root of the average variance obtained by a construct to be greater than the correlation between that construct and any other construct. Once this condition is satisfied, the attainment of discriminant validity is accomplished (Hamid et al., 2017). The Fornell-Larcker criterion is utilized in the domain of structural equation modelling, particularly in techniques such as partial least squares, to assess the discriminant validity. The criterion entails evaluating the squared construct correlations and the average variance extracted (AVE) through comparison. The Fornell-Larcker criterion is inherently associated with the common factor model. The accurate understanding of the Fornell-Larcker criterion in a model incorporating composites as structures remains ambiguous (Hilkenmeier et al., 2020).

Table 3 Fornell-Larcker criterion

	Burnout	**Environment**	**Health**	**Household Responsibilities**	**Lack of Access to Technology**	**Workload**
Burnout	0.849					

Environment	0.573	0.779				
Health	0.957	0.745	0.799			
Household Responsibilities	0.699	0.465	0.695	0.800		
Lack of Access to Technology	0.534	0.381	0.544	0.667	0.776	
Workload	0.864	0.647	0.881	0.710	0.602	0.779

Hypotheses Testing

Hypotheses		***Original Sample (O)***	***Sample Mean (M)***	***Standard Deviation (STDEV)***	***T Statistics (|O/STDEV|)***	***P Values***	***Decisions***
H1	**ENV -> WL**	0.388	0.382	0.049	7.856	**0.000**	Supported
H2	**HR -> WL**	0.409	0.402	0.047	8.688	**0.000**	Supported
H3	**LAT -> WL**	0.181	0.190	0.051	3.560	**0.000**	Supported
H5	**WL -> BO**	0.864	0.862	0.023	38.026	**0.000**	Supported
H4	**WL -> HLT**	0.881	0.878	0.021	41.974	**0.000**	Supported

H1: There is a relation between Environment (ENV) and Workload (WL).
The t-value achieved in this investigation is 7.856, which surpasses the critical limit of 1.96, suggesting statistical significance (7.856 > 1.96). In a similar vein, the p-value is presented as 0.000, which is below the preset significance threshold of 0.05, thus demonstrating statistical significance (as 0.000 < 0.05). The acceptance of H1 reveals a statistically significant link between Environmnet and Workload.

H2: There is a relation between Household Responsibility (HR) and Workload (WL).
The t-value achieved in this investigation is 8.688, which surpasses the critical limit of 1.96, suggesting statistical significance (8.688 > 1.96). In a similar vein, the p-value is presented as 0.000, which is below the preset significance threshold of 0.05, thus demonstrating statistical significance (as 0.000 < 0.05). The acceptance of H2 reveals a statistically significant link between Household Responsibility and Workload.

H3: There is relation between Lack of Access to Technology (LAT) and Workload (WL).
The t-value achieved in this investigation is 3.560, which surpasses the critical limit of 1.96, suggesting statistical significance (3.560 > 1.96). In a similar vein, the p-value is presented as 0.000, which is below the preset significance threshold of 0.05, thus demonstrating statistical significance (as 0.000 < 0.05). The acceptance of H3 reveals a statistically significant link between Lack of Access to Technology and Workload.

H4: There is a relation between Health (HLT) and Workload (WL).
The t-value achieved in this investigation is 41.974, which surpasses the critical limit of 1.96, suggesting statistical significance (41.974 > 1.96). In a similar vein, the p-value is presented as 0.000, which is below the preset significance threshold of 0.05, thus demonstrating statistical significance (as 0.000 < 0.05). The acceptance of H1 reveals a statistically significant link between Lack of Access to Technology and Workload.

H5: There is a relationship between Workload (WL) and women's Burnout (BO).
The t-value achieved in this investigation is 38.036, which surpasses the critical limit of 1.96, suggesting statistical significance (38.026 > 1.96). In a similar vein, the p-value is presented as 0.000, which is below the preset significance threshold of 0.05, thus demonstrating statistical significance (as 0.000 < 0.05). The acceptance of H1 reveals a statistically significant link between Workload and women's Burnout.

4. Conclusion

Based on the findings of the research, it can be inferred that there exists a correlation between the level of labor imposed on women and their experience of burnout. This conclusion was derived from the evaluation and validation of the project's hypotheses. Based on the study's findings, a prominent determinant contributing to the sensation of "burnout" among dairy farmers is the substantial workload they bear. Furthermore, the study unveiled a correlation between the pressures stemming from workload and individuals' health, along with the manifestations of stress and burnout. Hence, it is imperative to mitigate fatigue among female workers in smallholder dairy farming communities in Bangladesh by minimizing the workload, namely the physical exertion required.

Declaration of Conflict
There is no conflict of interest of the authors.

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