

Role Of Green HRM In Reducing Workplace Carbon Footprint: An Empirical Study



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Abstract

Climate change & increased carbon emissions, industries have had to acclimate the way they do things to be more environmental-friendly. The carbon footprint of a workplace includes the emissions that come from using power, traveling, using paper, and doing business. Green Human Resource Management (GHRM) is denoted HR policies & practices which encourage employees to be accountable with the environment & usage of resources in a way that it is beneficial for the environment. Environmental sustainability has become an important concern for establishments worldwide. GHRM integrates eco-friendly management into HR practices to help sustainable workplace performance. The current empirical research examines the role of Green HRM Practices in reducing workplace carbon footprint (WCF). A structured questionnaire was managed to get 174 employee's responses from various industries. Statistical tools applied like reliability (cronbach's alpha) analysis, descriptive test statistics, correlation & regression test analysis along-with ANOVA were used. The findings also revealed that GHRMP significantly contribute to reducing Carbon Footprint Reduction (C.F.Red) by encouraging sustainable employee performance. The research highlights the strategic significance of HR policies in accomplishing environmental sustainability objectives.

Keywords: Sustainable HR Practices, Green HRM Practices, Employee Awareness (E.Awa), Carbon Footprint Reduction (C.F.Red), Environmental Sustainability

Introduction

The deteriorating environmental problems, which comprises change in climate, resource depletion & rising greenhouse gas releases, has required industries to re-consider their functioning & strategic priorities. Industries are no longer arbitrated only on what way they make money; they are now being judged on their responsibility for the environment & how much they help to sustainable development. In such situation, establishments, investors & society are putting high pressure on industries to reduce their carbon footprints & use environmentally friendly methods (Khandelwal, 2018). In the past, industrial innovations & operational efficiencies were thought to be the foremost reasons for good environmental routine. Nevertheless, in recent years, human resource management role in reaching sustainability development goals (SDGs) has become a main emphasis of both academics & managers (Arora, E., 2018).

The term workplace carbon footprint (WCF) refers to the general quantity of greenhouse gases that an association releases into the air through its day-to-day processes, such as consuming energy, driving, using papers, making trash & running its

professional front (Tripathi, S., 2019). Environmental regulations as well as green technologies are quite important, but in what way they work rest on a lot employees act & the culture of the company. Employees have an impact on how much energy is used, how resources are protected, how waste is handled, and how ecologically friendly behaviors are adopted in the workplace. So, raising consciousness about the environment & making sustainability a part of how organizations work is very important for making a real difference in carbon emissions.

Green Human Resource Management (GHRM) is a deliberate way to enhance ecological sustainability to consistent HR responsibilities. It means making appointment procedures that attract applicants who care about the environment, giving personnel green training plans to expand their environmental consciousness & skills, in addition to environmental criteria related to performance appraisal structures & rewarding to employees towards sustainable actions (Kumar, t, et.al., 2021). By making sure that all human resource strategies are in line with ecological goals, industries may encourage workers to act in ways that are respectable for the

atmosphere & make sustainability a part of the culture of the company.

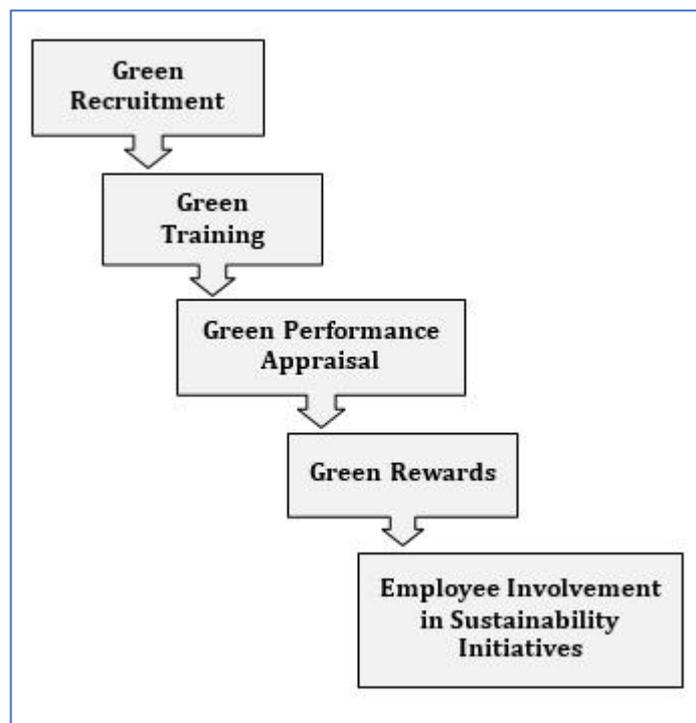


Figure 1: Green HRM Attributes

Recent researches indicate that mere employee awareness (E.Awa) may be insufficient for accomplishing assessable environmental results unless strengthened by systematic HR plans. In such context, Green HRM also serves as a formal background that converts environmental awareness as well as attitudes into unchanging, organizational-wide sustainable-based practices. However, empirical research examining the direct as well as mediating functions of Green HRM (GHRM) in qualifying workplace carbon footprint (WCF) is still rare, particularly in promising administrative situations.

In the light of such context, the recent study goals to empirically investigate the functions of Green HRM in fading the workplace carbon footprint (WCF) and to assess how employee conservational awareness impacts this relationship. The study seeks to clarify the complete mechanisms through which organized HR interventions might renovate environmental consciousness into measurable carbon reduction outcomes by inspecting both direct as well as intermediary effects. The outcomes are projected to enhance the prevailing literature on sustainable human resource management (HRM) & provide actionable supervision for organizations aiming for continuing environmental sustainability.

Review of Literature

(Renwick. Et.al., 2017) explored the strategic incorporation of Green HRM practices into

organizational sustainability contexts. The research stressed that green employment, training, & to manage performance are significant for receiving good environmental outcomes. It highlighted that planned ecological training considerably declines energy consumption patterns among the employees. The study also disclosed that HR practices that are aligned with environmental goals make carbon responsibility better. Empirical indication shown a measurable reduction in workplace releases when HR actions are aligned with sustainability philosophies. (Renwick. Et.al., 2017) highlighted that Green HRM (G.HRM) functions as a behavioral control instrument. The study firmly recognized HR departments as substances for environmental conversion. It established essential basis for the incorporation of HRM with carbon footprint reduction (C.F.Red). (Masri, et.al., 2018) observed the influence of Green HRM on environmental performance inside manufacturing firms. Authors findings indicated that green training to employees & employee engagement enhances environmental efficiency. The study exposed that initiatives that explain people about the environment cutting down on wasteful resources by a large amount. Corporations who used structured Green HRM systems said they released less carbon into the air. (Masri, et.al., 2018) stressed the importance of assistance from top management in putting green events into action. Statistical study exposed a significant correlation between HR practices and

sustainability outcomes. The study showed that cutting carbon emissions could save money in the long run. It came to the inference that Green HRM directly services the environment at workplace. (Pham. et.al., 2019) examined the intermediary function of employee green behavior in the relationship between GHRM & environmental performance. The study showed that employees who have been trained in sustainability act in an environmentally beneficial way at work. The outcomes showed that green engagement programs led to a big drop in actions that use a lot of carbon. It was detected that green rewards & recognition systems help people act in ways that are good for the environment. The research utilized SEM to confirm correlations. The results showed that GHRM reducing carbon footprint indirectly by changing people's behavior. (Pham. et.al., 2019) emphasized the requirement of employee awareness (E.Awa). The research strengthened the case for the incorporation of HR policy with carbon management measures.

(Yong. et.al., 2020) studied the correlation in between GHRMP & the environmental performance of establishments. The research specified that green employment assurances environmentally conscientious staff selection. Training agendas assisted employees take part in various activities that save the energy. Statistical data also demonstrated that a substantial decrease in carbon footprints (C.F.Red) within organizations that applied proactive green strategies. (Yong. et.al., 2020) recognized that ambient culture as a regulating variable. Employee awareness (E.Awa) became a critical factor in the actual implementation. Yong. et.al., 2020) found that by using systematic Green HRM methods expand the results of sustainability reporting. It also stressed the necessity to make sure that HR dimensions & environmental KPIs are in sync. (Singh. Et.al., 2021) analyzed the implementation of Green HRM in emerging economies. The research authenticated that ecologically absorbed HR practices considerably affect carbon reduction efforts (C.F.Red). Employees who were conscious of green plans acted dutifully when it came to consuming. The regression results showed a clear positive link between green training and lower emissions. (Singh. Et.al., 2021) highlighted digitalization as an instrument for reducing paper-based carbon (C.F.Red) emissions. The research focused on participating management in sustainability initiatives. It came to the decision that Green HRM adds proper value to the environment in a way that it can be measured. The

study validated HR-driven carbon management methods. (Roscoe. Et.al., 2022) concentrated on environmental workforce participation & reducing carbon footprints (C.F.Red). The outcomes showed that personnel who feel authorized are more likely to take part in activities that cut down on productions. Green performance assessment systems were related to environmental aims that could also be measured. The investigation validated that incentive-oriented environmental policies upsurge adherence. Structural model study exposed significant intermediating effects of employee awareness (E.Awa). Establishments that used Green HRM in a big way said that their carbon reporting necessities got improved. (Roscoe. Et.al., 2022) came to the assumption that HR is a main part of environmental governance. The study also validated Green HRM as a strategic tool for sustainability. (Khan. Et.al., 2024) looked into how Green HRM affects efforts to make workplaces carbon neutral. The research discovered that consistent green strategies substantially reduce the operational carbon footprint (C.F.Red). Employee awareness (E.Awa) was also recognized as a energetic success factor. The authors found that regression as well as mediation analysis to confirm associations. The findings of the research indicated that Green HRM partially mediates awareness as well as carbon reduction. Establishments who used planned sustainability training said they were healthier at controlling emissions. (Khan. Et.al., 2024) stressed the importance of environmental monitoring systems that use data. The study disclosed that Green HRM is vital for attaining continuing carbon sustainability purposes.

Research Methodology

The research employed a quantitative explanatory based research design methodology by using primary data gathered from total 174 respondents through a closed ended Structured questionnaire basis on a 5-point Likert scaling. Reliability among variables & constructs validity were also confirmed by using cronbach's alpha reliability testing. Descriptive analysis was also used to analyze the respondent's characteristics, although correlation as well as regression analysis were also be applied to test the direct associations. One-way ANOVA evaluated demographical differences. Mediation test analysis was also conducted to assess the mediating role of Green HRM Practices in between Employee Awareness (E.Awa) & Carbon Footprint Reduction (C.F.Red). All the hypothesis were proved at a 5% significance level by using SPSS software.

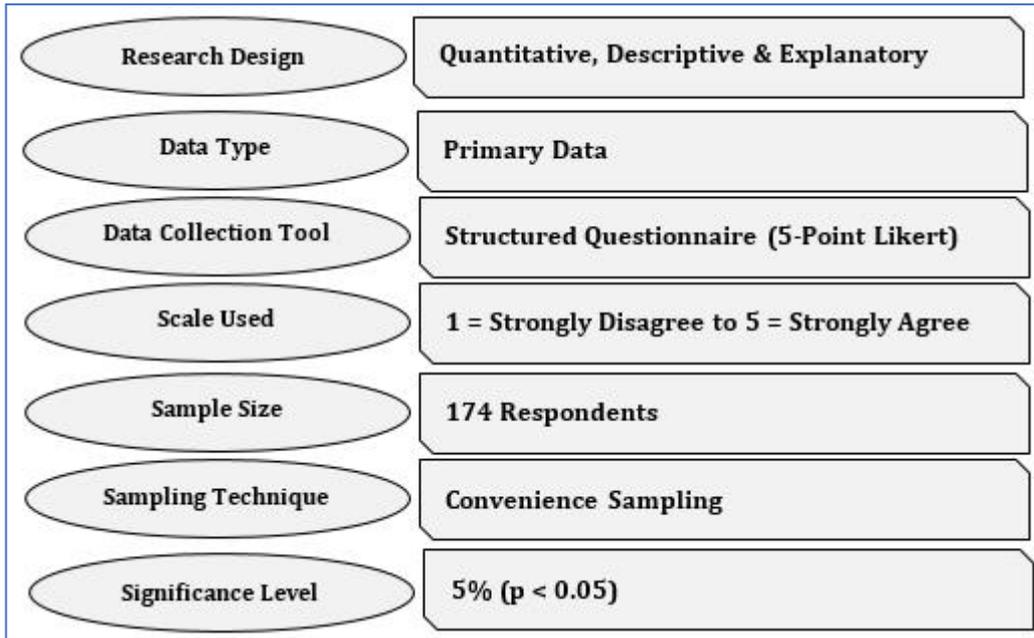


Figure 2: Research Methodology Framework

Research Objectives

- To examine the influence of Green HRM Practices on Carbon Footprint Reduction (C.F.Red).
- To analyze Employee Awareness (E.Awa) towards Green HRM Practices.
- To determine whether demographical factors impact perception towards Green HRM Practices.
- To analyze whether Green HRM Practices mediates the relationship in between Employee Awareness (E.Awa) & Workplace Carbon Footprint Reduction (C.F.Red).

Research Hypothesis

- H01: Green HRM Practices significantly reduces workplace carbon footprint Carbon Footprint (C.F.Red).
- H02: Employee Awareness (E.Awa) significantly impacts execution of Green HRM Practices.
- H03: There are significant differences in perceptions of Green HRM Practices across demographical groups.
- H04: Employee Awareness (E.Awa) significantly impacts Workplace Carbon Footprint Reduction (C.F.Red).
- H05: Green HRM Practices mediates the relationship in between Employee Awareness (E.Awa) & Workplace Carbon Footprint Reduction (C.F.Red)

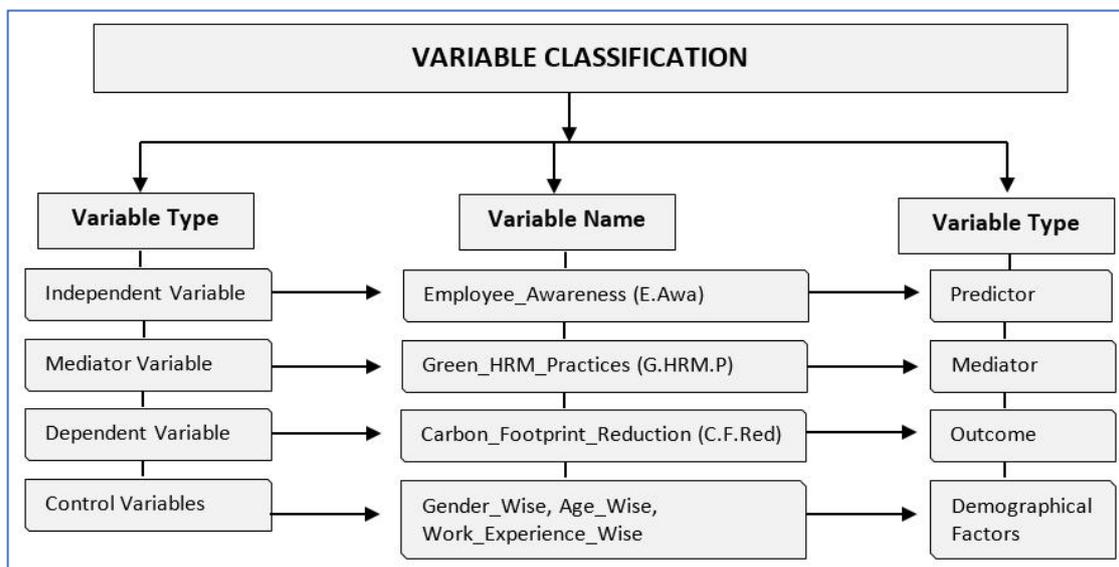


Figure 3: Variable Classification Model

Table 1: Gender Wise Distribution

Gender Wise	Freq.	Percent (%)
Male (M)	98	56.31%
Female (F)	76	43.70%
Total	174	100.00%

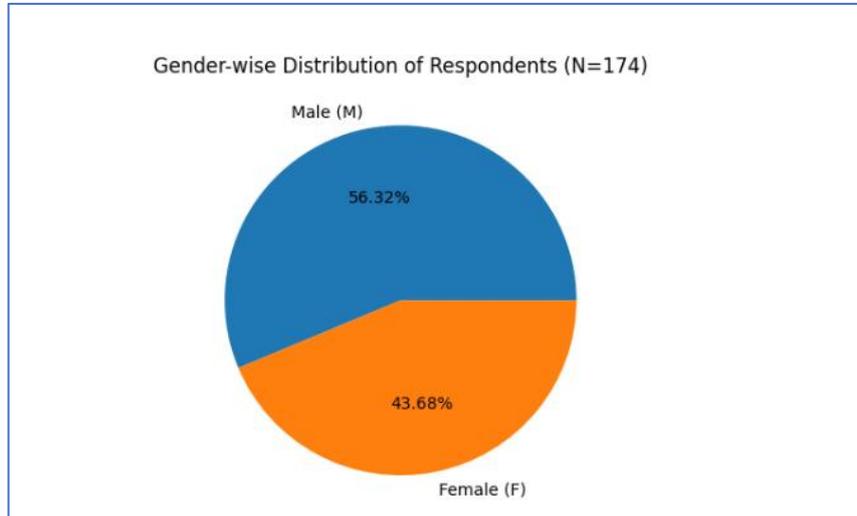


Figure 4: Gender Wise Distribution

In table 1, respondents majority falling male employees with (56.31%). Although, majority of female respondents found (43.70%), further showing a balanced representation. The gender wise distribution proposes that there is gender

balanced workplace diversity. Such kind of balance enhances perception-based reliability towards environmental responses. Gender wise neutrality guarantees that there is unbiased evaluation of Green HRM Practices.

Table 2: Age Wise Distribution

Age_Wise Group	Freq.	Percent (%)
21to 30	72	41.42%
31 to 40	58	33.32%
41to 50	30	17.24%
50 & above	14	8.13%
Total	174	100.00%

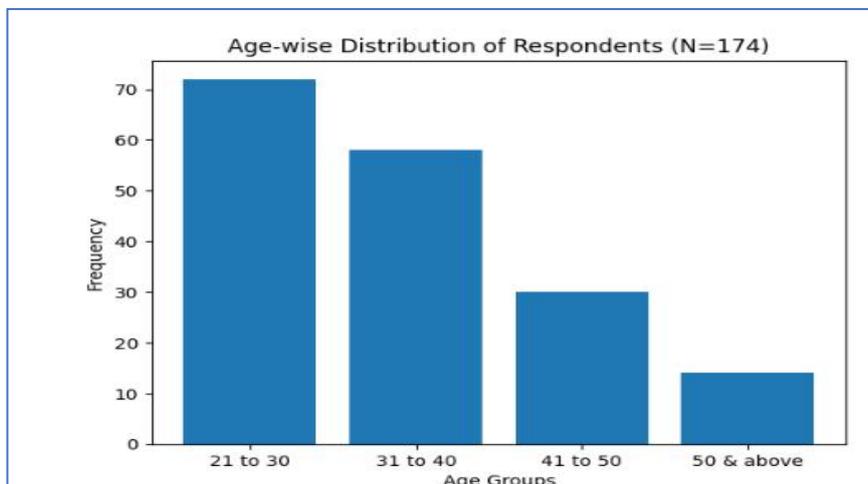


Figure 5: Age Wise Distribution

In table 2, Majority of respondents belonging to the age group of 21 to 30 yrs. With (41.42%). Younger

personnel shows holding a greater representation in the sample of the study. Employees >50+ yrs found

only (8.13%). Younger personnel are usually more environmentally aware. Age wise diversity supports

to analyze the generational variances in green perception.

Table 3: Work Experience Wise Distribution

Experience Wise	Freq.	Percent (%)
<5 yrs	68	39.13%
5 to 10 yrs	54	31.02%
10 to 15 yrs	32	18.40%
>15 yrs	20	11.50%
Total	174	100.00%

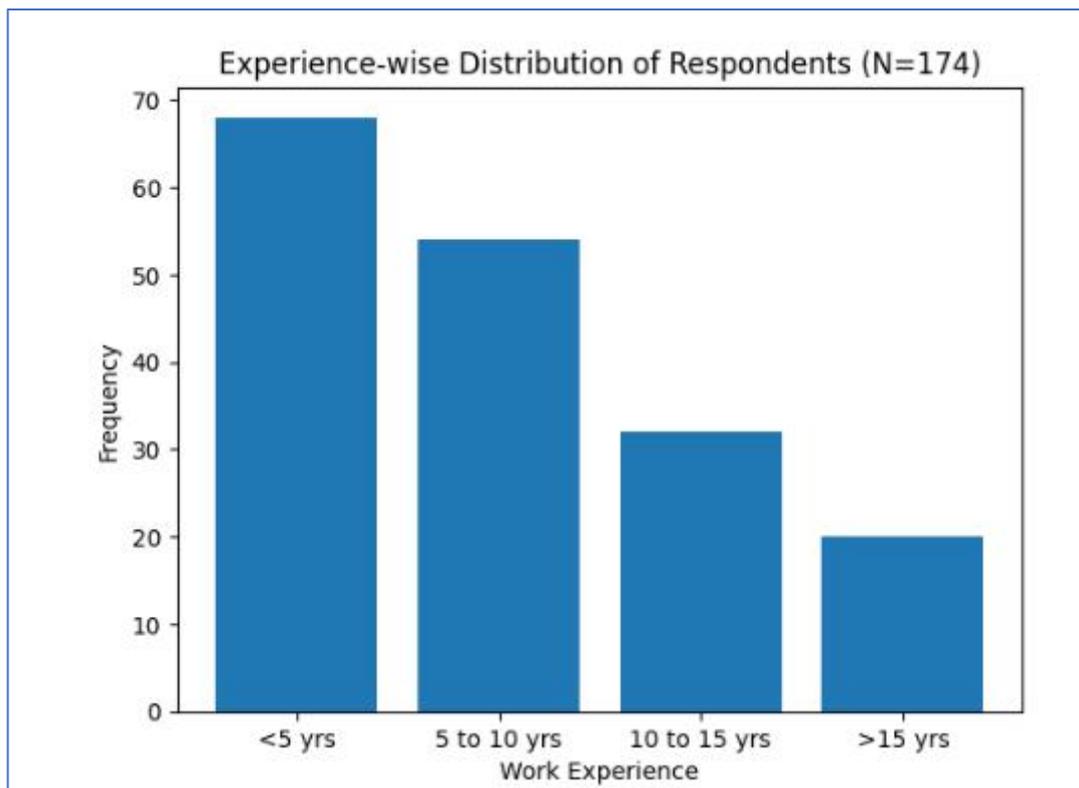


Figure 6: Work Experience Wise Distribution

In table 3, Majority of respondents having (39.13%) i.e. <5 yrs of experience. Employees falling in category 5 to10 yrs of work experience having 31.02%. Similarly, Senior employees >15 yrs of experience are having 11.50%. A mix of experienced

as well as highly experienced employees increases validity. Experience wise diversity supports examining the implementation practicality of Green HRM Practices.

Table 4: Reliability Test Analysis (Cronbach's Alpha)

Variable (s)	Scoring- Cronbach's Alpha
Green HRM Practices (G.HRM.P)	0.892 (Highly Reliable)
Employee Awareness (E.Awa)	0.873 (Highly Reliable)
Carbon Footprint Reduction (C.F.Red)	0.865 (Highly Reliable)
Overall Scale Value	0.904 (Excellent Reliability)

All Cronbach's Alpha reliability test values exceeded the threshold limit of 0.70. Overall reliability scale value is (0.904) which indicates excellent internal consistency among variables. Green HRM Practices shows there is strong reliability (0.892). Employee

Awareness (E.Awa) variable is also showing highly reliable having value is (0.873). The instrument demonstrating, it is statistically reliable for further analysis.

Table 5: Descriptive Statistical Analysis

Variable (s)	Mean Values	Std. Dev.
Green Recruitment (G.Rec)	4.021	0.71
Green Training (G.Tra)	4.14	0.68
Green Rewards (G.Rew)	3.77	0.82
Employee Awareness (E.Awa)	4.08	0.72
Carbon Footprint Reduction (C.F.Red)	4.10	0.65

Table 5, shows, that all mean values having >3.5 indicates strong agreement. Green Training (G.Tra) having highest mean value (4.14), that shows there is strong employee support. Employee awareness (E.Awa) mean value is (4.08) that further indicate

that there is high environmental consciousness. Std. Dev. are <1, representing that there is consistency in responses. Positively of employees notice green initiatives as well as sustainability efforts.

Table 6: Correlation Test Analysis

Variable (s)	Green HRM Practices	Employee Awareness (E.Awa)	Carbon Footprint Reduction (C.F.Red)
Green HRM Practices	1	0.654**	0.683**
Employee Awareness (E.Awa)	0.654**	1	0.701**
Carbon Footprint Reduction (C.F.Red)	0.683**	0.702**	1
<i>p</i> < 0.01			

Employee Awareness (E.Awa) & Green HRM Practices display strong positive correlation ($r = 0.654$). Employee Awareness (E.Awa) strongly associates with Carbon Footprint Reduction (C.F.Red) i.e., $r = 0.702$. All correlations are quite significant at

a 1% significant level. This also confirms that the higher awareness always increases Green HRM Practices (G.HRM.P) implementation. Consequently, H02 is fully satisfied & accepted on the basis of significant positive correlation.

Table 7: Regression Analysis (H2 Confirmed)

R	R ² (R Square)	Adjusted R ² (R Square)	F	Sig. Level
0.654	0.425	0.422	126.84	0.0000
<i>Dependent Variable - Green HRM Implementation; Independent Variable- Employee Awareness (E.Awa)</i>				

In table 7, value of R (0.654) shows that there is strong relationship. Similarly, value of ($R^2 = 0.425$) explains that there is (42.5%) differences in Green HRM Practices that is explained by Employee Awareness (E.Awa). F value (126.84) is statistically

significant. As far as significance level is concerned i.e. (0.0000) is <0.05. Henceforth, H02 is hypothetically accepted here through regression test analysis.

Table 8: Regression for H1

R	R ² (R Square)	Beta Value	t	Sig. Level
0.681	0.464	0.681	12.24	0.0000
<i>Dependent Variable- Carbon Footprint Reduction (C.F.Red)</i>				

Table 8 shows that G.HRM explains 46.40% of variation in carbon reduction. Beta value (0.681) indicates that there is strong positive impact. T

value (12.24) is extremely significant. P value (0.0000) approves that it is statistical significance. Consequently, H01 is accepted.

Table 9: ANOVA

F	Sig. Level
3.85	0.011
<i>(Age Wise vs Green HRM)</i>	

The table shows that significance value (0.011) which is lesser than of significance level 0.05. It

validated that, there is a statistically strong & significant differences among age wise groups.

Employees who are young revealing stronger green

perception. Demographical variation impacts green implementation. Consequently, H03 is accepted.

Table 10: Regression Analysis (Awareness Vs Carbon Reduction (Direct Effect))

R	R ² (R Square)	Beta Value	t	Sig. Level
0.702	0.492	0.702	13.54	0.0000
Dependent Variable- Carbon Footprint Reduction (C.F.Red); Independent Variable: Employee Awareness (E.Awa)				

Table 10 shows that R value (0.702) indicates that there is strong positive relationship. R² = 0.492 shows 49.20% variation is explained. Beta (0.702)

also confirms that there is strong direct impact. P value (0.0000) is highly significant. Consequently, H04 is accepted.

Table 11: Full Mediation (Multiple Regression Model)

Variable (s)	Beta Value	t	Sig. Level
Employee Awareness (E.Awa)	0.283	4.12	0.000
Green HRM Practices (G.HRM.P)	0.523	7.88	0.000
Dependent Variable- Carbon Footprint Reduction; Independent Variables- Employee Awareness, Green HRM			

Table 12: Model Summary

R	R ² (R Square)	F	Sig. Level
0.781	0.611	133.62	0.000

Table 11 & 12 is a combined model clarifies 61% of variation (R² = 0.611). Green HRM remains strongly substantial (Beta value = 0.523). Awareness beta decreases from 0.701 to 0.283. Reduction in beta specifies that there is partial mediation.

Subsequently both remain substantial, partial mediation is also confirmed. Hence, H05 is Accepted. Green HRM moderately mediates the relationship in between Employee Awareness (E.Awa) & Carbon Footprint Reduction (C.F.Red).

Table 13: Results of Hypothesis

Hypothesis Declaration & Tested Relationship	Status- Result
H01 : Green HRM Practices → Carbon Footprint Reduction (C.F.Red)	Hypothesis H01 is Accepted (Tested Through Regression analysis in Table 8)
H02 : Employee Awareness (E.Awa) → Green HRM Practices	Hypothesis H02 is Accepted (Tested through Correlation analysis & Regression analysis in Tables 6 & 7)
H03 : Demographical Factors → Green HRM Practices	Hypothesis H03 is Accepted (Tested Through ANOVA analysis in Table 9)
H04 : Employee Awareness (E.Awa) → Carbon Footprint Reduction (C.F.Red)	Hypothesis H04 is Accepted (Tested Through Regression analysis in Table 10)
H05 : Employee Awareness (E.Awa) → Green HRM Practices → Carbon Footprint Reduction (C.F.Red)	Hypothesis H05 is Accepted (It is Partial Mediation) (Tested through Multiple Regression analysis in Tables 11 & 12)

Findings & Conclusion

The current empirical study convincingly founds that Green HRM plays a strong & significant as well as strategic role in reducing workplace carbon footprint reduction (C.F.Red).. The statistical findings clearly demonstrated that Green HRM Practices significantly impact environmental performance, thus supporting H01. The outcomes further authorize that employee awareness (E.Awa) has a strong as well as significant impact on the implementation of Green HRM Practices, with H02 being satisfied through both by the correlation &

regression analysis. Additionally, demographical factors were also be found impactful for the perception towards Green HRM initiatives, leading to the acceptance of hypothesis H03.

More significantly, the mediation analysis offers deeper theoretical awareness by revealing that Green HRM acts as a significant as well as partial mediator in between employee awareness (E.Awa) & workplace carbon footprint reduction (C.F.Red). While employee awareness (E.Awa) directly impacts environmental outcomes, its influence becomes stronger & quite well- structured when supported

by formal Green HRM Practices. The decrease in the direct awareness effect after introducing G.HRM into the regression analysis model authorizes partial mediation. This further indicates that consciousness alone is not enough, it must be established through structured HR-driven strategies to produce measurable sustainability conclusions. Thus, hypothesis H04 & H05 are also accepted. The conclusions also authenticate that organizational HR programs serve as a fundamental mechanism that changes generally environmental consciousness into real-world carbon-reducing behaviors. The research quantitatively substantiates G.HRM as a practical sustainability agenda rather than a just hypothetical construct. Companies that use green appointments, green trainings, green presentation reviews & green repayment systems having clear improvements in their environmental-oriented performance. HR departments must therefore integrate sustainability objectives into performance management systems (PMS), offer ongoing environmental training, incentivize environmental initiatives, addressing for digital documentation to reduce paper usage, & support flexible or remote work activities to mitigate travel-related productions. Structured involvements like these support the organization's longstanding sustainability objectives.

However, the research had some drawbacks. The research employed a sample size of 174 respondents in total by using convenience sampling methods, possibly confining generalizability. By using self-reported data could also be led to response bias. Succeeding research could improve this study through relative industry examines, the application of SEM for healthier model authentication & the examination of additional mediators as well as employee green behavior & organizational culture. Overall, the research shows that Green HRM is not just a contemporary management movement; it is also a vital strategic move for longstanding growth of a corporate. Establishments can significantly lower their workplace carbon footprint (C.F.Red) & make an actual difference in accomplishment larger sustainability objectives by merging environmental awareness with planned HR systems.

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