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Demographic influences on knowledge management awareness: A case study of a Philippine state university

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Abstract: Examining the demographic influences on knowledge management (KM) awareness among personnel at Central Bicol State University of Agriculture (CBSUA), Philippines, addresses a critical gap in understanding KM implementation. The data were collected from 123 participants (71 faculty, 52 non-teaching staff) using stratified purposive sampling through a validated survey instrument (Cronbach's $\alpha = 0.85$). To analyze KM awareness across demographic variables, the Mann-Whitney U and Kruskal-Wallis tests were used. The median (4.000) KM awareness score was uniformly moderate-to-high across all groups. The analysis revealed that younger employees (25-35 and 36-46 years) demonstrated higher awareness levels ($Z = 1.14$ and 1.03, respectively) than older employees ($Z = -1.22$ to -1.32). The 6-10 years of experience group had the highest KM awareness ($Z = 1.78$), while the 30+ years of experience group showed the lowest awareness ($Z = -2.04$). No significant differences emerged by gender ($p = 0.0851$), age ($p = 0.181$), education ($p = 0.202$), or experience ($p = 0.101$). The findings provide a basis for developing KM strategies tailored to specific demographic profiles among teaching and non-teaching personnel, enabling the institution to transform tacit knowledge into explicit organizational assets that will improve academic quality and administrative efficiency.

Keywords: *Demographic analysis, Higher education institutions, Knowledge management, Organizational awareness, Strategic management.*

1. Introduction

Higher education institutions (HEIs) utilize experience, organizational values, contextual information, and professional insights to form their knowledge base. Knowledge is crucial in HEIs as it is created in various academic and administrative processes, including teaching, research, organizational routines, and practices Charles and Nawe [1]. Rowley [2] emphasized that the value of knowledge lies in improving educational outcomes, enhancing organizational effectiveness, and promoting innovation. Furthermore, valuing knowledge as an asset in HEIs can leverage existing facilities, systems, and projects to improve the management and utilization of knowledge.

Agarwal and Marouf [3] highlight the importance of discussing the role and creation of knowledge within universities to improve institutional development, as expertise is embedded in different epistemological frames across departments and units within an organization. Knowledge is considered a vital economic resource, comparable to traditional assets such as human capital and physical capital Vyas [4]. Ng et al. [5] further emphasized that knowledge management (KM) is not only crucial for managing and utilizing knowledge effectively but also for enhancing learning opportunities and financial sustainability. However, knowledge management in HEIs remains poorly understood because of a limited theoretical framework to guide universities in knowledge formation, growth, and communication [6].

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Serban and Luan [7] defined knowledge management as the systematic use of an organization's intellectual capital to achieve efficiency, ensure a competitive advantage, and spur innovation. In the public sector, knowledge management is an essential strategy that systematically acquires, exchanges, renews, and handles organizational data to enhance productivity and efficiency Kassa and Ning [8]. Baptista Nunes et al. [9] observed that KM is underexplored in HEIs, especially in the operational management of knowledge assets to improve instruction, research, and administrative roles. Sedziuviene and Vveinhardt [10] argue that KM is necessary for the competitiveness of HEIs by integrating processes, people, and technology in effectively utilizing intellectual resources. Knowledge management, revolving around creating, using, and disseminating knowledge, in higher education institutions, deserves focused attention, as knowledge is widely used among faculty, staff, and students [11]. In particular, as the core business of HEIs revolves around knowledge sharing and learning, KM is a significant tool to improve organizational efficiency and effectiveness [5]. In the global context, knowledge management in HEIs demonstrates diverse and interconnected strategic roles across different regions. For instance, Nigerian universities perceive KM as a tool to strengthen teaching and learning processes, create new academic programs, enhance curricula, and support student and alumni services [12]. Similarly, HEIs in Chiang Mai emphasize KM as crucial to knowledge creation and support of the organization's strategic goals [13]. From an operational perspective, KM enhances organizational efficiency, strategic planning, innovation, and decision-making in some Indian institutions [14] and improves strategic capabilities while facilitating knowledge processes in Mauritius' HEIs [15]. Knowledge management is a foundation for innovation and collaboration that supports the development of innovative universities, particularly in Iraq, enabling them to gain a competitive advantage and adapt to technological changes [16]. Knowledge management is consistently identified as a critical factor in supporting educational growth, influencing development impact, benefiting society, and informing future research and policy development across various contexts. Knowledge management awareness among employees is crucial to understand as a strategic imperative for Philippine higher education institutions to improve their competitive advantage, optimize resource utilization, and foster innovation. This study, an assessment of KM awareness across different demographic variables at Central Bicol State University of Agriculture (CBSUA), not only fills a critical research gap in the Philippine context but also offers actionable insights for institutional leaders to develop targeted interventions that can transform tacit knowledge into explicit organizational assets. Institutions can better design and implement KM strategies that align with their workforce's characteristics by identifying patterns and variations in KM awareness among teaching and non-teaching staff, thereby improving academic quality, administrative efficiency, and institutional development in a knowledge-driven educational landscape. This study employed a descriptive-evaluative method to assess KM awareness among 123 CBSUA employees (71 teaching and 52 non-teaching), selected through stratified purposive sampling. Data were collected using a modified survey questionnaire by Valaei and Ab Aziz [17] and Khanal [18], consisting of 11 questions rated on a 5-point Likert scale, data were collected through Google Forms and in-person distribution. The analysis was conducted using MS Excel 2021 for descriptive statistics and Minitab 17 for Mann-Whitney U and Kruskal-Wallis tests to examine KM awareness by demographic variables.

2. Literature Review

Knowledge Management (KM), a systematic approach to capturing, organizing, and sharing organizational knowledge, has gained increasing attention in higher education institutions (HEIs). Some studies show that increased awareness of KM concepts leads to greater familiarity with its practices. Organizations that achieve higher awareness demonstrate enhanced engagement in knowledge-sharing activities alongside improved organizational outcomes Ogunbanwo et al. [19]. Elistia et al. [20] found that by optimizing knowledge sharing, facilitating information dissemination, and integrating diverse knowledge sources to promote innovation, productivity, and management expertise, knowledge management may significantly enhance sustainable competitive advantage. For instance, Sharma [14]

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observed that, at Indian universities, implementing KM as a critical component of academic processes, research collaboration, and administration is viewed by faculty members as an effective endeavor, with documented improvements resulting from its implementation. Sobaih et al. [21] noted that HEIs are concerned with their organizational performance to meet the needs of their stakeholders and perform in the market primarily by achieving performance goals and meeting consumer demands. Research shows that educators who understand KM principles collaborate more effectively with colleagues to create interactive, knowledge-rich learning environments [22]. Knowledge management in higher education institutions is understood at different levels (academic and administrative) across diverse global contexts. In Indian universities, KM is not well understood [14], and Nigerian HEIs lack understanding of KM concepts and their benefits among university administrators and faculty members [12]. Similarly, Mongolian higher education institutions have significantly low knowledge management awareness among administrative employees [23]. However, contrasting cases of success have emerged in various institutions, such as Malaysian HEI personnel who demonstrate strong recognition of KM's role and usefulness [24], while employees at Yarmouk University (YU) and Amman National University (ANU) demonstrate high awareness of KM concepts, roles, and benefits in building organizational competitive advantage [25]. Furthermore, Nigerian tertiary institutions have relatively high KM awareness levels, but there are significant differences between students and academic staff [19]. An encouraging case is shown in two Peruvian universities, where KM awareness among faculty and students showed significant improvement before and during the COVID-19 pandemic, especially regarding university-industry collaboration [26]. Some studies indicate that KM is often overlooked in HEIs, despite growing recognition among educators and administrators (Veer Ramjeawon and Rowley [15]. Potgieter et al. [27] noted that while employees in some organizations understand KM concepts and align with their workplace values, they fail to translate this understanding into practice. Ojo [12] noted that a dichotomy exists between faculty awareness of KM practices and the institutional capacity to implement them. Fiscal [28] research on KM awareness in Philippine state universities suggested that while it is a vital initial step, successful KM implementation requires strategic emphasis on both key organizational factors, especially employee motivation (73%, r=0.857) and knowledge application processes (73%, r=0.854) to significantly influence teaching, research, and institutional impact outcomes. Significant disparities in KM implementation persist across diverse institutional and geographical settings. In Mauritius, local experts can theoretically conceptualize KM; however, actual institutional strategies remain underdeveloped [15]. Higher education institutions face challenges in implementing KM uniformly due to varying understandings of KM [3]. Divergence in KM understanding was observed across South Asian HEIs [9] with distinct perceptions among faculty members, administrative personnel, and librarians, in Mongolia's HEIs, while teaching personnel and administrative managers view KM as intuitive, data indicate that it is an innovative concept that requires a more structured understanding and implementation [23]. Empirical findings from institutions in Lucknow suggest that educational administrators and faculty have superficial knowledge of KM concepts and their integration into operational frameworks, Agarwal and Pande [29]. Herminingsih and Ratnasari [30], implied that quality culture also indirectly affects knowledge management maturity in human resource management practices, as observed in Indonesian universities, where quality culture has a substantial impact on HRM practices (standardized coefficient = 2.152, $p = 0.031$), which, in turn, have a direct effect on knowledge management maturity (standardized coefficient = 3.548, $p < 0.001$). However, the direct effect of quality culture on KMM is statistically insignificant [30].

3. Methods

3.1. Research Design and Method

A Google Forms survey was disseminated via official institutional email addresses that restrict responses to a single domain, thereby preventing duplicate entries. The survey lasted 6 weeks, from July 15 to August 30, 2022, with automated email reminders sent in weeks 2, 4, and 6. The study aimed to

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assess KM awareness among teaching and non-teaching personnel at CBSUA and to examine variations by demographics, including gender, age, level of education, and years of work experience.

3.2. Sampling Procedure

A stratified purposeful sampling was used to achieve proportional representation of teaching and non-teaching personnel across CBSUA's four campuses (Calabanga, Pasacao, Pili, and Sipocot). A 30% sampling fraction was applied [31] for each stratum to maintain sample homogeneity. The use of a 30% sampling fraction adheres to Bhardwaj [32], wherein stratum-specific sample sizes are proportional to the total population of each stratum. Stratified, purposeful (random) sampling is a method in which specific strata are selected for the sample in the same proportions as in the population [33]. Table 1 shows the number of identified teaching and non-teaching personnel.

Table 1.
Number of Teaching and Non-Teaching Personnel.

Campus	Teaching Personnel No. of Population	Non-Teaching Personnel No. of Population
Calabanga	50	20
Pasacao	22	9
Pili	163	93
Sipocot	61	25
Total	296	147

3.3. Sample Size Determination

A total of 133 respondents were selected as the study's sample. The sample size was validated through: (1) comparison against sampling table recommendations [34]; (2) a 30% sampling ratio guideline for populations under 1000 [35], and (3) power analysis [36]. A sampling ratio of 20% to 30% was used as the statistical power for significant analysis in educational research involving small to medium-sized populations [37].

3.4. Response Rate Analysis

The survey achieved an 84.8% response rate (123 out of 145 participants) after three follow-up reminder emails, exceeding the 48% average response rate for educational research [38] and meeting the 75% threshold for academic research [39]. This indicates a high response rate and a lower likelihood of non-response bias, thereby enhancing generalizability [40]. Wave analysis [41] was performed to compare early respondents (n=50, weeks 1-3) and late respondents (n=42, weeks 4-6), resulting in no significant differences in age ($t(121)=1.45$, $p=.149$), gender ($\chi^2(1)=0.78$, $p=.377$), or education level ($\chi^2(3)=2.24$, $p=.524$), suggesting a non-response bias. The remaining 31 responses were obtained through an in-person survey. For the 22 non-responses (15.2% of the sample), follow-up analysis revealed the following patterns: a) unable to access email/Google Form (n=7); b) on leave during the survey period (n=7); c) chose not to participate (n=6); and d) technical difficulties (n=2). Multiple imputation strategies were also employed to address potential non-response bias due to missing values, assuming missing completely at random (MCAR), as determined by Little's MCAR test ($\chi^2=28.45$, $df=25$, $p=.286$).

3.5. Research Instrument

3.5.1. Instrument Development

To measure KM awareness in educational institutions, the study used a structured questionnaire based on Valaei and Ab Aziz [17] and Khanal [18] conducted research, with modifications to some terminology. Valaei and Ab Aziz [17] investigated KM awareness among Iranian SMEs, including nine questions on understanding KM, while Khanal [18] examined KM awareness among financial

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institutions in Nepal. The instrument was modified while preserving its core assessment functionality for KM awareness. Table 2 summarizes the modifications made to the questionnaire.

Table 2.
Modifications for the Questionnaire used to assess the Level of KM Awareness.

Original Statements	Content Organization	
	Reference/Source	**Modification Rationale**
1. KM is the process of creating, assimilating, retaining, and utilizing knowledge.	Knowledge management is a process of acquiring, validating, utilizing, sharing, storing, and diffusing knowledge [42] and is a significant factor in identifying, capturing, and using employees' accumulated knowledge and experience to maintain and develop the organization's knowledge base [43].	No revision was made.
2. KM is the management of information, knowledge, and experience accessible to a company.	The core purpose of KM is to enable organizations to gain a competitive advantage [18].	To align with the university context, the phrase 'accessible to a company' was removed for this study.
3. KM is something already being done, but not under the same name.	According to Khanal [18], KM principles have been practiced, whether consciously or unconsciously, within an organization.	No revision was made.
4. KM is all about utilizing ICT.	Information and communication technologies, such as email and databases, can encourage employees to perceive the benefits of knowledge management (KM) [17].	No revision was made.
5. KM is a type of process-improvement method (for instance, Just-in-Time, MBO, and so forth).	KM can empower business processes that enhance the efficiency of a particular organization [17].	The statement was adopted by the study and removed the phrase 'for instance: Just in Time, MBO, etc.' to align with the context of the university.
6. KM is a strategic part of the business.	Khanal [18] noted that KM serves as a tool that creates strategic impact, enhancing an organization's efficiency.	This statement was adopted, but the word 'business' was replaced with 'organization,' which is more fitting in the educational context.
7. KM is a new marketing strategy.	An organization must be familiar with all KM concepts, processes, and strategies as intellectual assets for managing intangible assets to thrive in the current market [17].	The same concept was applied to the study, and the term 'marketing' was changed to 'organizational' to describe the educational context.
8. KM is something that could benefit the organization.	KM offers significant benefits across sectors such as education, banking, telecommunications, manufacturing, and public services [44].	No revision was made.
9. KM is a mandatory training program for all managers.	KM is a widely accepted training program for executives to learn its advantages and apply its principles in their organizations [17].	No revision was made.
10. KM is a theory developed by an academician.	Academics and practitioners have widely discussed KM, but there is a gap in the literature in some contexts [18].	No revision was made.
11. KM is a management trend or fad.	KM sometimes refers to a management fad in which innovative concepts or techniques are promoted as leading management progress, which then diffuses throughout organizations seeking a competitive advantage [45].	No revision was made.

Note: KM = Knowledge Management; ICT = Information and Communication Technology

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The research instrument was designed with two main parts: Part I included demographic variables such as gender, age bracket, levels of education, and years of work experience for comparative analysis. In Part II, 11 modified and validated statements were used to measure KM awareness, with responses rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

3.5.2. Content Validation

The content validation adheres to guidelines for selecting 5-10 experts [46, 47] and follows a systematic protocol that considers their academic qualifications and expertise. This includes holding a doctoral degree, having at least 8 years of professional experience, and demonstrating research expertise through peer-reviewed publications. Seven experts were selected, comprising faculty knowledgeable in KM (n=3), academic administrators (n=2), and senior faculty researchers (n=2). The validation approach includes a quantitative method for rating scales and a qualitative method for feedback analysis. According to the protocol established by Davis [48] for relevance, clarity, and appropriateness, the experts evaluated the questionnaire using a 4-point scale (1 = not relevant, 4 = highly appropriate).

3.5.3. Instrument Reliability and Validity

The survey questionnaire's statistical validation yielded strong results across multiple measures. The validation includes Cronbach's alpha for internal consistency with (α=0.87, [95%, CI: 0.83-0.91]); factor analysis (λ=0.66-0.89) with 76.4% of the total variance; test-retest reliability (r=0.86, p<.001, n=30); Content Validity Index (I-CVI) analysis with strong individual item validity (I-CVI: 0.78-1.00); and Scale-level Content Validity Index (S-CVI) of 0.89 exceeded the established criterion of 0.80.

To obtain consensus, two rounds of the Delphi technique [49] were used. The first round achieved 73% agreement across experts, indicating an improvement of 91% in the second round. Fleiss' kappa calculation revealed strong agreement (0.82, $p < .001$) in the inter-rater reliability assessment. A thematic coding approach was employed, revealing three primary themes: contextual relevance (mentioned by 6 experts), terminology clarity (mentioned by 5 experts), and construct alignment (cited by 7 experts). The feedback resulted in a restatement of some terminology for statements 5, 6, and 7, with a range of 0.58-0.67 to 0.72-0.84.

The established protocol for conducting the consensus process was used, with clear criteria and resolution mechanisms. In cases of disagreement with certain statements, a systematic resolution process and records of modification rationale were employed. Items without complete consensus were retained if there was at least 85% expert agreement and demonstrated strong statistical validity (I-CVI $\geq$ 0.85).

3.5.4. Pilot Testing

The pilot testing phase involved thirty participants selected through purposive (non-random) sampling, comprising faculty members (60%) and non-teaching staff (40%). Faculty participants (n = 6 each) were from disciplines such as social sciences, professional education, and professional studies. The non-teaching participants (n = 12) included key administrative staff from academic affairs, student services, and the research support office. Participants' years of service ranged from 5 to 20 years. Among them, 40% (n = 12) held a doctorate, 45% (n = 14) held a master's degree, and the remaining 15% (n = 4) held a bachelor's degree. Each participant completed the instrument independently under standardized conditions, with an average completion time of 3 to 5 minutes. Participants provided structured feedback on the clarity, understanding, and relevance of each item after completing the survey. Quantitative analyses were conducted on the pilot test data, including response patterns, completion rates, and the pattern of missing values. This rigorous piloting protocol enabled the detection of potential challenges with dissemination and confirmed that the survey is accessible regardless of educational role or experience level.

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3.6. Data Collection Procedures

3.6.1. Participant Recruitment Process

The participant recruitment process involves identifying potential respondents for the study and providing them with information to gauge their interest in participating in the proposed research study [50]. The study employed a participant recruitment strategy, sending invitation emails to 145 teaching and non-teaching employees to participate in the survey. Students and employees (teaching and non-teaching) without permanent employment status were excluded from the study. Another participant recruitment strategy involved obtaining permission from the University's Information and Communications Technology Office (ICTO) to acquire a list of verified institutional email addresses for the involved teaching and non-teaching personnel.

3.6.2. Data Collection Process

To maximize participation and accessibility, a systematic dual-mode approach was used to collect data. Google Forms was the primary mode of distribution, utilizing the "limit to 1 response" feature to prevent duplicate entries. A secondary in-person distribution method was employed to accommodate participants with limited digital access and to address technical issues. A unique link was generated for online survey distribution to track response rates and ensure the completeness of the data collection. The protocols in the online survey include: a) unique access links of the online survey; b) institutional email authentication; c) automatic data encryption; and d) response validation checks. Participants with informed consent were allowed to access the survey electronically in accordance with the university's research ethics guidelines on data confidentiality.

3.6.3. Response Rates

The accumulated number of participants who responded to the survey comprises 71 out of 93 (76.34%) teaching employees, while 52 out of 52 (100%) non-teaching employees (Table 3). The collected data provided an adequate sample size to test the level of awareness regarding knowledge management, using stratified purposeful (random) sampling without compromising the response rates.

Table 3.
Response Rates of Teaching and Non-Teaching Personnel.

	Total Population	Sample Size	No. of Questionnaire	No. of Response	Response Rates
Teaching Personnel	296	89	93	71	76.34%
Non-Teaching Personnel	147	44	52	52	100%
Total	443	133	145	123	

3.6.4. Conduct of Survey

The average completion time for the survey, regardless of distribution mode (in-person or online), was 3 minutes due to the inclusion of only 11 primary indicators to measure KM awareness. However, respondents were given an ideal survey length of five minutes to reduce dropout rates.

In conducting both survey types, researchers followed standardized protocols that included ethical elements such as the opportunity to withdraw, omit items, maintain privacy, ensure confidentiality, and obtain informed consent [51]. The study implies that specific survey protocols [52] were followed, including choosing target respondents and a suitable substitute, revisiting the target respondents a sufficient number of times, monitoring the primary sampling, disclosing which sampling units should be dropped as well as the reasons why, and replacing the original sample if required.

3.6.5. Address Duplicate Response

A robust duplicate response prevention protocol was implemented for both online and in-person data collection modalities. For participants who completed both survey types, institutional email addresses were used as unique identifiers to cross-reference responses. To prevent duplicate responses,

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especially for online surveys, the researchers opted to limit responses to one per person per submission. Although many online platforms include features that prevent duplicate responses, Buchanan and Scofield [53] state that duplicate responses are still feasible. Thorough data screening procedures can be conducted using deduplication methods to identify duplicate data points, establish decision protocols for duplicates, and utilize software such as Microsoft Excel.

3.6.6. Data Quality

Data quality is a significant challenge in the data collection process. It refers to the utility of data for specific purposes [54], including accuracy, precision, timeliness, reliability, completeness, and significance.

A methodological, multi-phase validation procedure was implemented for data quality assurance, including automated validation checks and a three-step data cleaning process. Missing values with fewer than 20% were reviewed individually, while those with more than 20% were handled using multiple imputation techniques. All variables were used consistently, following a specific coding scheme, and independent quality control tests were conducted regularly to ensure data consistency.

3.6.7. Non-Response Bias

The degree of non-response and the variation in the estimation between respondents and non-respondents are the two components that contribute to non-response bias [55]. The occurrence of non-response bias in this study is less evident because the participants meet the standard sample requirements, including both teaching and non-teaching personnel. To address non-response bias, non-respondents were contacted to determine the reasons for their non-participation and were provided with a thorough yet brief orientation to the study's importance. Prince [56] noted that reducing non-response can help mitigate non-response bias. Additionally, even when response rates exceed 70%, considerable non-response bias can still occur [56, 57]. The response rates of 76.34% from teaching personnel and 100% from non-teaching personnel indicate no evidence of non-response bias.

3.6.8. Data Consistency

Data consistency refers to the state in which all copies or instances of data are identical across all systems and databases [58]. The study took specific measures to ensure data consistency between in-person and online modes, including a) defining required data; b) data validation and verification; c) consistent naming or coding conventions; d) standardized procedures for data collection, storage, access, and sharing; and e) data monitoring and review. By applying these specific measures, the study provides consistent datasets across all indicators.

3.7. Data Analysis Technique

3.7.1. Statistical Approach

Descriptive and inferential statistical analyses were employed to ensure comprehensive data interpretation and analysis. Descriptive statistics were used to clarify the dataset's objective, including demographic data. Inferences about the general population were made using inferential statistics to reveal notable differences in KM awareness between teaching and non-teaching personnel. Chaumba [59] noted that descriptive statistics summarize the distribution of variables of interest in describing the gathered data, while inferential statistics are used to make inferences from the data. Vetter [60] noted that descriptive statistics are presented either numerically within the text and/or tables or graphically in figures. Through hypothesis testing, inferential statistics determine whether the observed data exhibit differences or relationships that exceed random chance [61].

3.7.2. Data Cleaning and Preparation

Data cleaning is a crucial analytical technique that eliminates duplicate data and converts it into standardized data formats [62, 63]. Data cleaning processes involve collecting, extracting,

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reformatting, combining, verifying, transforming, cleansing, and storing data from the source [64]. The collected data was subjected to verification, combination, and transformation to ensure consistency before storing it in a structured database for subsequent analysis.

3.7.3. Missing Data Management

In data collection, missing values and outliers often exist, reducing the available data for analysis and compromising statistical power and reliability Kwak and Kim [65]. Kang [66] identifies four major issues associated with missing values, including reduced statistical power, parameter bias, sample unrepresentativeness, and increased complexity of analysis.

The study employed an analysis of missing values, evaluating three different imputation techniques: listwise deletion, mean imputation, and multiple imputation (MI). Mean imputation reduces data variability, listwise deletion risks bias, and reduces statistical power, while MI requires complex computational resources. The study used the most common imputation (MCI) method to replace missing values, as only 3% of the data was missing within the acceptable range of 1%-5% [67], which maintained the ordinal structure and computational efficiency.

3.7.4. Statistical Tools and Procedures

Non-parametric tests were selected for the study due to the data characteristics, research objectives, and the ordinal nature of the Likert-scale data. For dichotomous independent groups (e.g., male vs. female; teaching vs. non-teaching), the Mann-Whitney U test was employed. To compare categorical demographic variables with KM awareness levels among teaching and non-teaching personnel, the Kruskal-Wallis test was used. All statistical procedures were conducted at a 95% confidence level for reliability.

The statistical software tools used were MS Excel 2021 for initial organization and visualization of demographic data, and Minitab 17 for Mann-Whitney U and Kruskal-Wallis tests due to its advanced statistical features. Comprehensive data management and advanced statistical analysis were enabled by combining the tools.

3.7.5. Effect Size Analysis

To establish the practical relevance of the results, effect sizes were calculated and reported alongside the corresponding significance tests. We calculated effect sizes for Mann-Whitney U tests using the formula $Z/\sqrt{N}$ and for Kruskal-Wallis tests using eta-squared (η^2). Cohen [68] and Cohen [36] guidelines for effect size analysis specify that a small effect size corresponds to $r = 0.1$ and $\eta^2 = 0.01$, a medium effect to $r = 0.3$ and $\eta^2 = 0.06$, and a significant impact to $r = 0.5$ and $\eta^2 = 0.14$.

4. Results

4.1. Demographic Characteristics of CBSUA Employees

A descriptive demographic analysis was conducted to explain the socio-economic characteristics of 123 participants, comprising 71 teaching and 52 non-teaching personnel.

Gender. Demographically, a significant female predominance was observed among both teaching and non-teaching personnel. Specifically, in the teaching category, 69.01% comprised females, while 30.99% were males. Similarly, within the non-teaching category, females accounted for 67.31% of the workforce, while males accounted for 32.69%.

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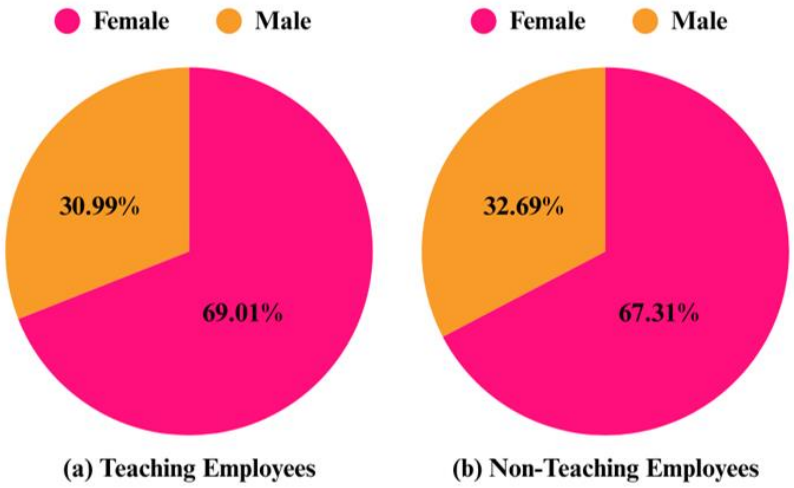

Figure 1.
Teaching and Non-Teaching Employees' Gender Analysis.

Age Bracket. The age distribution revealed two prominent age cohorts, comprising 32.52% of the sample, with age ranges of 36-46 and 47-57 years. Furthermore, 24.39% of the sample falls within the 25-35 years age bracket, whereas the oldest cohort (58 years and older) accounts for 10.57% of the sample.

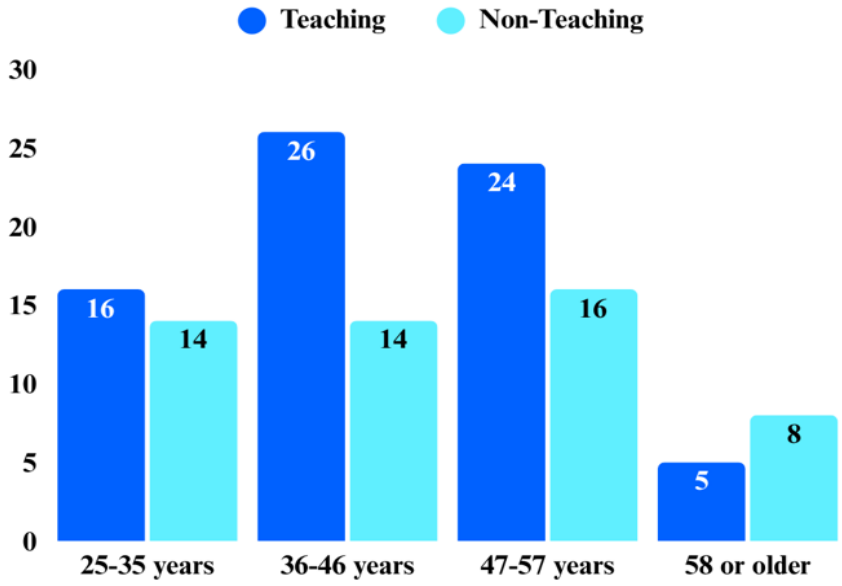

Figure 2.
Teaching and Non-Teaching Employees' Age Analysis

Levels of Education. There were variances in educational qualifications among teaching and non-teaching personnel. Master's degree holders comprised the largest demographic, accounting for 52.11% of faculty members, compared with non-teaching staff, who predominantly held Bachelor's degrees (67.31%). Notably, a single participant held a diploma.

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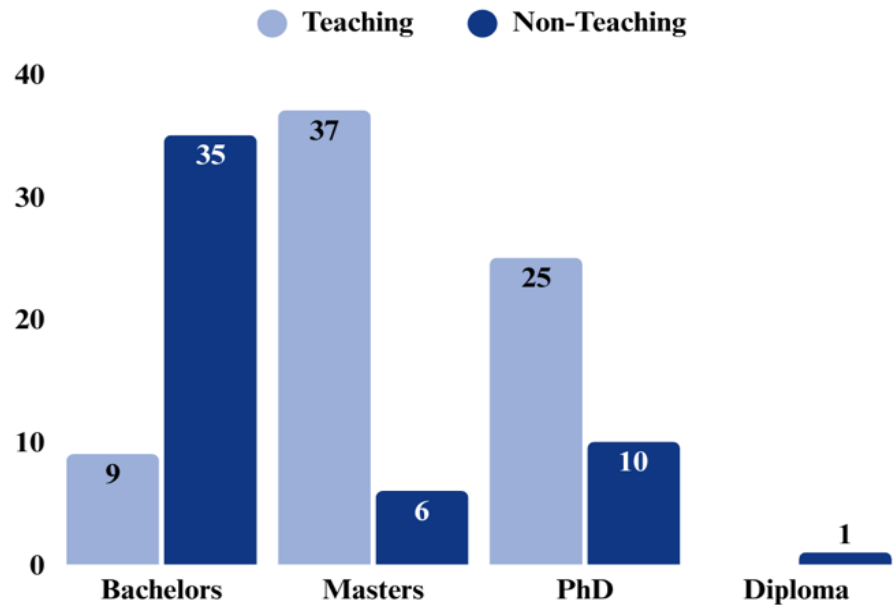

Figure 3.
Teaching and Non-Teaching Employees' Levels of Education Analysis.

Years of Work Experience. Data on work experience composition revealed that the majority of employees have intermediate tenure (11-20 years of experience, 29.27%), followed closely by those in the 21-30-year range (26.02%). A substantial proportion consists of employees with 6-10 years of service (22.76%), whereas those with 3-5 years of experience constitute a somewhat smaller group (13.01%). An even smaller cohort comprises long-serving personnel with 30 years or more of experience (8.94%).

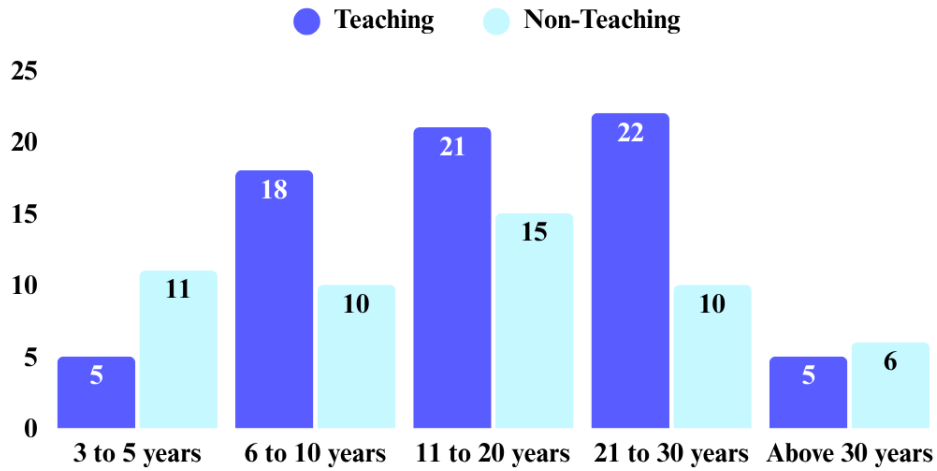

Figure 4.
Teaching and Non-Teaching Employees' Years of Work Experience Analysis.

4.2. Awareness in Knowledge Management among Teaching and Non-Teaching

The Mann-Whitney U test (U = 3426.0, p = 0.270) results indicated no significant differences in knowledge management awareness between teaching personnel and non-teaching staff.

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Table 4.
Level of Awareness in Knowledge Management among Teaching and Non-Teaching Employees of CBSUA.

Metric	Sample Size (N)	Median
Awareness Non-Teaching	52	4.0000
Awareness Teaching	71	4.0000

Note: Point estimate for η1-η2 is -0.0000
95.% CI for η1 - η2 is (0.0001,0.5001)
Test of η1 = η2 vs η1 ≠ η2 is significant at 0.3022.

A gender-based analysis (W = 2692.0, p = 0.0851) revealed no significant difference in mean awareness scores between male and female participants.

Table 5.
Level of Awareness in Knowledge Management among Teaching and Non-Teaching Employees of CBSUA in terms of Gender.

Characteristic	Sample Size (N)	Median
Male Awareness	39	4.0000
Female Awareness	84	4.0000

Note: Point estimate for η1-η2 is 0.0000
95.1% CI for η1 - η2 is (0.0000,0.5000)
Test of η1 = η2 vs η1 ≠ η2 is significant at 0.1077.

No significant difference was found using the Kruskal-Wallis test (H = 4.26, p = 0.235) for age group trends. Age brackets of 25-35 years, 36-46 years, 47-57 years, and 58+ years yielded observed average ranks of 67.9, 66.2, 55.8, and 49.3, respectively, with standardized scores of 1.14, 1.03, -1.22, and -1.32.

Table 6.
Level of Awareness in Knowledge Management among Teaching and Non-Teaching Employees of CBSUA in terms of Age Bracket.

Age Bracket	Sample Size (N)	Median	Average Rank	Z
25-35 years old	30	4.000	67.9	1.14
36-46 years old	40	4.000	66.2	1.03
47-57 years old	40	4.000	55.8	-1.22
58 years or older	13	4.000	49.3	-1.32
Overall	123	-	61.5	-

Note: H = 4.26; DF = 3; P = 0.235
H = 4.88; DF = 3; P = 0.181 (adjusted for ties).

The Kruskal-Wallis test (H = 4.03, p = 0.258) demonstrated no significant difference across various educational attainment categories.

Table 7.
Level of Awareness in Knowledge Management among Teaching and Non-Teaching Employees of CBSUA in terms of Levels of Education.

Education	Sample Size (N)	Median	Average Rank	Z
Bachelors	44	4.000	64.2	0.62
Diploma	1	5.000	109.5	1.36
Masters	43	4.000	64.1	0.59
PhD	35	4.000	53.7	-1.55
Overall	123	-	61.5	-

Note: H = 4.03, DF = 3, P = 0.25
H = 4.62, DF = 3, P = 0.202 (adjusted for ties)
One or a small sample.

Across various levels of expertise, no significant variation in average rank was observed. Notable results emerged: those with 6-10 years of experience had the highest mean ranking, while those with

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more than 30 years of experience had the lowest. Consistent median awareness scores were recorded across all years of experience groups.

Table 8.
Level of Awareness in Knowledge Management among Teaching and Non-Teaching Employees of CBSUA in terms of Years of Experience.

Years of Experience	Sample Size (N)	Median	Average Rank	Z
11 to 20 years	36	4.000	63.0	0.30
21 to 30 years	32	4.000	60.2	-0.24
3 to 5 years	16	4.000	56.1	-0.66
6 to 10 years	28	4.000	72.0	1.78
Above 30 years	11	4.000	39.6	-2.04
Overall	123	-	61.5	-

Note: H = 6.77, DF = 4, P = 0.149
H = 7.75, DF = 4, P = 0.101 (adjusted for ties).

5. Discussion

5.1. Demographic Profile and Its Implications for Knowledge Management

The analysis of gender distribution showed that females constituted a significant majority in teaching (69.01%) and non-teaching (67.31%) personnel. This gender composition corresponds with the broader trend in Philippine HEIs, where women have historically been predominant in the education sector. The presence of a female majority in this environment may affect practices related to knowledge sharing and organizational culture, thereby contributing to the development and implementation of knowledge management strategies.

Teaching employees fall mainly within the 36-46 years age bracket, whereas non-teaching employees primarily belong to the 47-57 years age group. This workforce distribution in HEIs indicates that professionals have gained professional experience and acquired institutional expertise. Knowledge management initiatives benefit faculty members at the early to mid-career stage because this age group demonstrates both professional knowledge and adaptability to systems.

In terms of education, the university personnel demonstrated a solid academic foundation, with 52.11% of faculty members holding master's degrees and 67.31% of non-teaching staff possessing bachelor's degrees. This educational profile exceeds the minimum requirements set by the Civil Service Commission, positioning CBSUA favorably for the implementation of profound inquiry and knowledge management. The significant number of advanced degree holders indicates a workforce capable of interacting with complex knowledge management systems and contributing to the creation and dissemination of knowledge.

5.2. Knowledge Management Awareness Analysis

Statistical analysis revealed several patterns in KM awareness across demographic variables. Although the Mann-Whitney U tests indicated no statistically significant differences between teaching and non-teaching staff ($p = 0.2703$) or between genders ($p = 0.0851$), the consistent median score of 4.0000 across all groups implies a uniformly moderate to high level of awareness throughout the institution. The results were consistent with those of Ogunbanwo et al. [19], who found that KM awareness among stakeholders in Nigerian tertiary institutions is relatively high. They noted that a higher KM awareness level can lead to more effective implementation of KM practices and a better overall KM status within the institution. Baptista Nunes et al. [9] study asserts that faculty members generally recognize the importance of KM in enhancing teaching and research capabilities, while administrative staff are typically more aware of KM's strategic benefits for organizational efficiency and decision-making processes. By improving academic staff efficiency through proper training and development in KM practices, challenges in the education sector can be addressed [69]. Business schools demonstrate greater KM awareness and a stronger emphasis on practice than HEIs because they focus on delivering practical knowledge relevant to current industry needs [70]. In Nepali higher

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education institutions, faculty members exhibit a high level of awareness and practice regarding the seven dimensions of knowledge management [71]. In other cases, academic staff in Zambian HEIs also have a good level of KM awareness; however, they have relatively low familiarity with KM practices due to the absence of formal KM policies or strategies [72]. According to Zoubi [25], enhanced worker KM awareness can result in improved decision-making and job performance. Furthermore, V Nair and Munusami [24] emphasize that HEIs need to create KM awareness among employees to enhance innovation and improve the teaching-learning environment. Effective leadership also plays a crucial role in promoting the adoption and awareness of KM in universities, fostering a culture that values knowledge sharing and management [5].

Awareness of KM practices among academic and administrative staff in Indian universities is limited due to challenges in gathering and managing knowledge assets [14]. A limited understanding of the concept and its potential benefits is also evident among university administrators and faculty members in Nigerian higher education institutions, Ojo [12]. Ojo [12] stated that while faculty members are aware of KM practices, the identified institutions lack established strategies or policies to implement these practices effectively. This result also reflects the situation in HEIs in Mongolia, where staff and management awareness appears relatively low, indicating a need to improve KM awareness [23]. Furthermore, university personnel at Mbeya University of Science and Technology lack awareness and initiatives regarding KM practices, Charles and Nawe [1]. Veer Ramjeawon and Rowley [15] note that although participants in participating HEIs could discuss KM processes, none had a formal KM strategy, indicating a lack of awareness of KM's importance among the involved institutions. Furthermore, understanding and awareness of KM concepts among educational administrators and faculty in Lucknow's institutions are relatively limited, as KM concepts are only partially integrated into their operational frameworks Agarwal and Pande [29]. Saleh et al. [73] stress that for an educational institution to enhance KM awareness, one recommendation is to launch awareness campaigns to educate stakeholders about the importance of KM and its benefits. The study by Ogunbanwo et al. [19] supports this recommendation because increased awareness leads institutions to adopt effective KM strategies that improve decision-making, shorten product development cycles, and enhance academic and administrative services.

The Kruskal-Wallis test analysis across age groups revealed an interesting pattern, as indicated by Z-scores, although the results were not statistically significant ($p = 0.181$). The scores above the mean ($Z = 1.14$, $Z = 1.03$) in the 25-35 year and 36-46 year groups showed positive Z-scores, which were opposed to the negative scores ($Z = -1.22$, $Z = -1.32$) in both the 47-57 year and 58+ year groups, indicating an underlying pattern of knowledge management awareness based on age relationships. When designing training and implementation strategies for knowledge management suitable for the target age group, this trend should be considered.

Analysis of educational levels revealed no significant differences ($p = 0.202$), despite median scores (4.000) being uniform across holders of Bachelor's, Master's, and doctoral degrees. Bachelor's and Master's degree holders have comparable levels of awareness, whereas Doctoral holders demonstrate relatively lower awareness. Other organizational factors may supplant educational attainment in determining KM awareness. The result contradicts Agarwal and Pande's [29] study, which found that levels of education can be a factor in the depth of awareness, understanding, and engagement with KM concepts.

Years of experience showed no significant difference due to a constant median awareness score (4.000). Employees with 6 and 10 years of experience had the highest positive Z-scores, while those with more than 30 years of experience had the lowest Z-score. This pattern suggests that professionals in the middle of their careers may be the most engaged with KM concepts, making them excellent candidates for spearheading knowledge management initiatives. The results align with Idhalama and Echedom's [22] study, which found that experienced and less experienced faculty members in Isoko South Local Government Area of Delta State, Nigeria, have a high level of awareness regarding KM. Similarly,

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senior managers at Jordanian universities recognize that knowledge is a valuable asset and believe that KM adds value to the university's outcomes [25].

5.3. Organizational Implications

The empirical analysis yields multiple important implications that inform the implementation of the knowledge management (KM) strategy at CBSUA. The statistical results show that both teaching and non-teaching personnel maintain similar awareness levels (median = 4.000), which creates a uniform base for KM policy creation. To enhance innovation and corporate performance, internal knowledge and skills, interactions with external stakeholders, and KM procedures can serve as the ultimate tools for an organization to improve its innovation capability [21]. The Mann-Whitney U test results ($W = 3426.0$, $p = 0.2703$) indicate that there is no statistically significant difference between the employee groups, allowing the institution to deploy KM strategies uniformly across all staff categories.

The current employee demographics offer valuable opportunities to implement KM strategies. Kumari et al. [74] noted that HEIs should implement trust-building practices, foster collegiality among employees, and promote appropriate cultural practices to enhance readiness to adopt knowledge management systems. The university must focus on gender-inclusive KM practices, given the higher percentage of female teachers, 69.01% of the staff, and 67.31% of non-teaching personnel. The Mann-Whitney test comparing gender awareness (median = 4.000 for both groups, $p = 0.0851$) supports this approach. The workforce age distribution shows that teaching staff primarily belong to the 36-46 years age group (36.62%), while non-teaching staff mainly belong to the 47-57 years age group (30.77%). The Kruskal-Wallis test indicates that there are no significant age-related variations ($H = 4.88$, $p = 0.181$), but the results highlight the need for age-tailored knowledge transfer methods.

CBSUA's qualified workforce creates specific opportunities to implement advanced knowledge-sharing systems. The institution maintains a skilled workforce through its teaching staff — Master's degree holders at 52.11% — and its non-teaching staff — Bachelor's degree holders at 67.31% — who are prepared to participate in advanced KM practices. The results of the Kruskal-Wallis test for the level of education ($H = 4.62$, $p = 0.202$) indicate that KM initiatives are effective for all educational groups but require consideration of their specific roles and expertise levels.

A significant portion of the teaching staff (30.99%) with 21-30 years of experience, and the non-teaching staff (28.55%) with 11-20 years of experience, serve as essential institutional knowledge holders. Results from the Kruskal-Wallis test ($H = 7.75$, $p = 0.101$) reveal no significant relationship between experience duration and KM awareness. However, the different average ranks indicate that experienced staff members require specialized knowledge capture strategies.

Research findings on the demographic effects on KM awareness and implementation readiness contribute to the existing knowledge about KM practices in higher education institutions. The equal median awareness scores across demographic groups and the ranking differences suggest that CBSUA has the potential to implement a comprehensive knowledge management strategy through demographic-specific approaches. The combination of people, technology, and processes for knowledge management initiatives can encourage cross- and internal collaboration between faculty and personnel, facilitating the exchange of ideas in higher education institutions by advancing their knowledge base [11].

The study examines awareness patterns across various demographics to identify the institutional characteristics that contribute to knowledge management success in higher education institutions. The emphasis on directing KM processes toward institutionalization through integrated knowledge strategies across all organizational units can systematically deliver the desired benefits of adopting knowledge management approaches by focusing on practical use and applying them toward attaining strategic goals and operational objectives [6]. The Philippines, as a developing country, may invest in knowledge management creation, acquisition, sharing, and dissemination to advance the Sustainable Development Goals, especially by improving organizational memory to achieve global development targets [75]. Future research should investigate how targeted KM initiatives affect institutions over

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time while evaluating knowledge transfer methods that match different participant demographics within similar educational institutions.

6. Conclusion

Analysis of demographic variables regarding KM awareness levels revealed substantial support for theoretical frameworks of organizational KM. Despite average KM awareness, the study highlighted the importance of training and targeted KM initiatives to institutionalize KM effectively. The study's findings can make a meaningful contribution to the discourse on KM implementation within HEIs, although geographic and methodological limitations constrain them. Future research should elucidate the disparity between KM awareness and implementation by evaluating technological infrastructure and organizational culture within educational contexts. The study suggested that educational institutions incorporate evidence-based KM awareness initiatives into faculty development programs to cultivate knowledge-driven learning environments and enhance academic innovation by developing knowledge assets.

7. Limitation

Several limitations have been considered in the study. First, variations in sample size across demographic variables, particularly the single participant in the diploma category, may limit the generalizability of comparisons across levels of education. Second, the study focused primarily on KM awareness rather than actual knowledge management practices. This study does not address the gap between awareness and actual practice. Third, the institutional context of CBSUA, as one of the higher education institutions in the Philippines and the specific focus of the study, may limit the direct applicability of findings to other institutional contexts or geographical regions.

Institutional Review Board Statement:

The authors confirm that this manuscript offers an honest, truthful, and transparent account of the research conducted at Central Bicol State University of Agriculture (CBSUA). All data collection procedures, analysis methods, and results have been thoroughly presented, including all essential details. The research was conducted in compliance with the university's ethical standards, particularly regarding data confidentiality and obtaining informed consent from all participants.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Copyright:

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