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An Analytical Study on Work–Life Balance Determinants of Women Researchers with Reference to Family and Child-Care Roles

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Abstract: Work-Life Balance (WLB) has been recognised as one of the most important issues for women researchers conducting research work in institutions of higher education. This research examines how demographic factors, including family type, age category, and children's age, affect perspectives on the factors that determine work-life balance for women research scholars. For data acquisition, primary research was conducted on 961 valid respondents working in universities, government colleges, and Self-Financing institutions. Analysis of the response data has been carried out using descriptive statistics to identify respondent characteristics, followed by inferential analysis using 'Analysis of Variance' and 'Correlation Analysis.' The finding reveals that demographic factors, including type of family and children's age, are non-significant influencers for perceptions about work-life balance factors, including 'career', 'family responsibility', 'personal', 'social', and 'Work-life' factors. The research identifies very strong, equally significant correlations among work-life balance factors, indicating interdependence between personal and work-life affairs. This research work emphasises work-life balance for women research scholars who experience equal difficulties in both personal and professional spheres, and stresses the need for such support within institutions.

Keywords: Women Research Scholars; Family Type; ANOVA Analysis; Correlation Analysis; Work–Life Balance; Analysis of Variance; Family Responsibility; Academic Leadership; Data-Driven Decision-Making.

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1. Introduction

Work-life balance has been a major topic of discussion in academia, especially for women in research-focused fields. As colleges and universities become increasingly complex ecosystems of teaching, knowledge generation, and academic leadership, women researchers sometimes have to manage many overlapping tasks. Their professional identities require commitment to teaching, research, publishing, administrative responsibilities, and academic networking [1]. In contrast, their personal and societal roles may encompass child-rearing, supporting extended family, household management, adherence to

cultural norms, and engagement in community-oriented activities [2]. The intersection of these areas often leaves women feeling that their time, energy, and emotional resources are constantly stretched. They have to balance the demands of being reliable family members and productive scholars, which often leads to mental stress, role conflict, and a constant feeling of being pulled in two different directions. In India, these problems are considerably more important. Over the past 20 years, Indian higher education has grown significantly. More women are now going on to graduate school, getting their PhDs, and working as postdocs. However, this growing engagement doesn't always mean that the path to becoming a female academic will be easier.

Many women who do research also work as full- or part-time faculty members. Their jobs encompass more than just teaching; they also include preparing lessons, mentoring students, serving on institutional committees, and participating in accreditation-related activities. These duties compete for attention with personal and domestic work, especially in homes where traditional gender roles still exist. In these situations, women often still have to handle most of the housework, including cooking, cleaning, caring for children, and managing the household. Even when they get help from their husbands or other family members, they often still feel that they have to make sure the house runs well. When there are academic deadlines, the stress of having to do both jobs is worse. Research scientists must adhere to deadlines for coursework, thesis submissions, conference participation, journal articles, grant bids, and various other academic commitments. These requirements are typically non-negotiable and very time-sensitive, so women have to adjust their daily routines to meet their academic commitments. Because of this, family time may be cut short, fun activities may be put off, and sleep may be lost.

This imbalance can slowly hurt both your physical and mental health, causing stress, tiredness, burnout, anxiety, and thoughts of not being good enough. Many women say they have to switch back and forth between work and personal duties all the time, so they rarely have time to engage in concentrated study without interruptions. People often regard multitasking as a good thing, but it can actually make it harder to undertake significant intellectual work that is necessary for innovation, theoretical progress, and methodological rigour. This scenario gets even more complicated when women researchers have small children. Taking care of children requires constant attention, and the fact that their requirements can change at any time can make it hard to stick to research schedules. Even if they are in the middle of writing, testing, or gathering data, women may have to stop what they are doing to take care of their children. The guilt of not being totally there for their children can coexist with the shame of not being productive enough in research. This emotional problem, prevalent among numerous women in academic professions, engenders a nuanced yet enduring psychological struggle that traditional institutional approaches frequently overlook.

In India, colleges and universities often use research output to decide who gets promoted, who gets recognised, and who gets a job. For example, the number of publications, participation in funded research, patent applications, and conference appearances are generally used as essential criteria for judging how well faculty members are doing. These high standards push people to do their best, but they don't always account for the extra work that women scholars have to undertake. Workplaces could not have flexible hours, areas that are good for kids, research support systems, or policies that include families. In certain institutions, cultural biases may persist in subtle forms, leading to inequitable task allocation or diminished recognition of the obstacles faced by female academics. When these institutional structures fail to account for the realities of women scholars, it leads to an unavoidable imbalance between work and life. The interaction among familial circumstances, institutional expectations, and personal aspirations can significantly affect research output and academic achievement. Women may postpone pursuing research degrees due to familial obligations or may require additional time to complete doctoral studies. Some people might choose not to do any research after having trouble balancing both tasks.

This results in a lack of women in higher academic roles, such as associate professors, professors, and research administrators. This makes academic leadership less diverse and limits the range of gender-inclusive perspectives that can inform policy. Consequently, a deeper understanding of the factors affecting work-life balance is essential not only to support individual scholars but also to strengthen the academic system as a whole. This study investigated the experiences of female research scholars at Indian higher education institutions to understand how demographic characteristics, including family structure, age cohort, and children's age, influence perceptions of work-life balance. The study employed empirical data from 961 participants, yielding one of the most extensive datasets in this area of research. Family type is a particularly significant element in the Indian setting, as nuclear families and joint families exhibit considerable differences in their support structures. Women who live in nuclear families frequently have to take care of their children and do housework with fewer people to help them. On the other hand, women living in joint families may receive support from parents, in-laws, or other relatives. But living in a combined family can also bring additional responsibilities, social norms, and commitments that may indirectly affect school routines.

Age is also an important factor in how people experience work and life. Young scholars in their twenties and early thirties may have to balance starting their careers and starting families at the same time. Their professional identity is still forming, and they may feel a lot of pressure to show that they can do well in school. Older researchers may have more stable professions, but they may also have additional family responsibilities, such as caring for ageing parents or supporting teenage children. The children's

ages also make women's experiences distinct. Mothers with young children may struggle with the constant need for supervision, while mothers of older children may struggle with schoolwork, homework help, and emotional support. These elements together affect how women feel about the stresses of work, family obligations, their own health, social expectations, and their general satisfaction with their work-life balance. The data from 961 individuals enabled the examination of perceptual variations across demographic categories. The research revealed significant differences in both the extent of work-life conflict encountered and women's perceptions of professional progression, familial responsibilities, personal demands, and societal pressures. For many women, their job goals are closely linked to their family responsibilities. Individuals who feel they have significant support from their spouses, parents, or extended family tend to report better work-life balance and greater optimism about career advancement. On the other hand, women who don't receive sufficient support generally report feeling more stressed and unhappy, and having trouble being productive in school.

Personal factors, including self-motivation, health, emotional resilience, and individual coping strategies, influence the degree of work-life conflict experienced. Some women can handle many roles well, while others struggle to stay engaged in school because they are emotionally exhausted. Women feel even more pressure from social expectations, such as those of their family, neighbours, and community members. Societal conventions regarding optimal motherhood, expectations surrounding women's domestic duties, and social scrutiny can hinder academic pursuits. Even when families are supportive, cultural expectations may still leave women feeling they can't spend as much time on research as they would like. Even with schoolwork deadlines, people sometimes have to attend community events, family gatherings, and religious or cultural events. Because of this, women may have to give up their own interests, rest, or free time to meet the demands of their job, family, and society. Consequently, general work-life experience emerges as a complex phenomenon influenced by the interplay of demographic, psychological, cultural, and institutional factors. The study's results reveal a significant research gap: Many studies recognise the challenges women face in academic settings, yet few have systematically examined the impact of demographic variables on these experiences within an empirical framework. This research elucidates the influence of family type, age group, and children's age on perceptions of work-life balance variables, offering a complex picture of how demographic variations connect with academic duties for female professors in India.

The ramifications of the research transcend personal experiences and influence broader institutional and policy-level considerations. Colleges and universities need to realise that work-life balance is not just a personal issue, but also a systemic one that affects gender equality, academic retention, and research output. Institutions might need to make their work regulations more flexible, ensure there are easy-to-use childcare facilities, set up mentorship programs, and create spaces where women feel encouraged to combine their work and family lives. Policies that acknowledge caregiving duties and advocate for fair workload allocation could greatly enhance the work-life experiences of female researchers. This research provides policymakers with significant insights into women's experiences in academia, emphasising the need for data-driven decision-making focused on gender inclusion and increased research productivity. A complex interplay of demographic factors, familial contexts, institutional frameworks, cultural expectations, and individual desires influences the work-life balance of female research scholars in India. Women encounter unique problems stemming from the twin demands of academic and household tasks, which vary by age, family dynamics, and child-related responsibilities. The study's results show how important it is to recognise these disparities and incorporate them into the rules institutions set. To help women scholars in their academic journeys and to advance the broader aims of gender parity, research excellence, and sustainable academic development in the Indian higher education system, it is important to consider work-life balance holistically.

2. Literature Review

Work-life balance (WLB): Work-life balance has emerged as a key research topic, given the context of working women professionals who simultaneously play diverse roles in both personal and professional environments. Contemporary research on work-life balance highlights that work-life balance encompasses more than just ‘time management’. For working research scholars, balancing their pursuit of academic growth with obligations to their personal and professional environments becomes even more challenging [3]. It has also long been postulated that academia imposes harsh performance tasks on researchers, including publication pressures, long working hours, and involvement in teaching and administration. This can conflict with personal responsibilities for home and family, including child care, household management, and elder care. Various studies reveal that women are confronted with more role conflict and burnout than men in academia, mainly for reasons of societal pressures viewing caregiving as largely a female responsibility [4]. Some important studies highlighting the role of demographic factors in WLB are discussed below. Family type has often been regarded as one of the most important variables.

In nuclear families, though women can enjoy more independence, they are often left to handle most home responsibilities on their own, even when they are working. Also, joint families can help with household duties, but additional sociological pressures can often complicate WLB. However, research studies on this topic reveal divergent opinions on whether WLB is strongly influenced by family type, and this manuscript shows that family type has no significant impact on perceptions of WLB factors among women research scholars [5]; [6]. The age of children has also received extensive attention as an important factor that

impacts WLB. Research widely establishes that children's childcare needs are higher, thereby increasing work-life conflict. Younger children are often seen as reducing mothers' research productivity and increasing stress. However, as this research shows, recent studies indicate that institutional and personal variables are more important than children's age alone [7]. This data analysis reveals that there is no significant variation in perceptions of work-life balance across children's ages, unlike previous views that perceived work-life imbalance as consistently higher for mothers with younger children [8].

Another domain covered in existing studies is the relationship between WLB determinants: pressures to develop one's profession, responsibilities to one's family, personal strategies for coping with work-life pressures, and societal pressures. It has been observed that various factors are interlinked, meaning that an imbalance in one area causes stress on others. The very high correlation among the personal, societal, family, and professional pressures shown in this manuscript is evident. This explains why WLB can't be reduced to a single factor [9]; [10]. Although previous research has mainly focused on general female employees, current research has begun to identify the distinct nature of academic contexts. Female research scholars' functioning in environments where they compete for success in terms of publications, securing grants, and maintaining productivity [11]. However, personal responsibilities can also contribute to elevated stress levels. Although stress can become problematic, scholars recognise that employee-oriented firm practices improve work-life balance [12]. On the whole, the literature review indicates that WLB among women research scholars is influenced by various factors in complex ways. This research adds to previous studies on this topic by showing that age, family type, and children's age do not affect WLB perceptions.

3. Methodology

The study employs a descriptive-analytical research design to examine women research scholars' perceptions of determinants of work–life balance. Quantitative methods were used to analyse demographic variations and relationships among variables.

3.1. Sample and Data Collection

A structured questionnaire was administered to women research scholars employed in various higher education institutions, including government, government-aided, and self-financing colleges. Of the 1050 distributed questionnaires, 961 were deemed valid, yielding a response rate of 91.52%.

3.2. Respondent Profile

Respondents were primarily grouped by age, family type, and children's age.

- Most belonged to the 26–30 age group, representing 60.04%, whereas only 2.91% were below 25 and 2.29% were above 36 years.
- Family structure analysis showed that 70.55% lived in nuclear families, 28.20% in joint families, and 1.35% individually.
- Respondents with children under age 2 accounted for 33.40%, while smaller proportions were in higher child-age categories.

3.3. Statistical Tools Used

Descriptive analysis summarised the demographic characteristics. Inferential analysis involved:

- ANOVA tests to identify differences in perceptions of WLB determinants across family type and children's age.
- Correlation analysis to determine interrelationships among WLB determinants.

3.4. Variables Studied

Five core WLB determinants were evaluated:

- Career
- Family Responsibilities
- Personal
- Social
- Work Life

These variables served as the basis for hypothesis testing and correlation analysis.

3.5. Hypothesis Testing

Two major hypotheses were tested:

- Whether family type influences the perception of WLB determinants.
- Whether the age group of children influences the perception of WLB determinants.

Both hypotheses were examined using ANOVA at $\alpha = 0.05$.

4. Analysis

Research work entails analysing data, which is its core. After collecting data using applicable research tools and methodologies, the logical approach is to analyse and interpret the data, with a focus on developing an empirical approach to solving research problems. Analysis and data, or rather data interpretation, form the core research activity. The essence or spirit of data analysis entails classifying and summarising data gathered to create meaning for subsequent interpretation, providing kindling for research questions posed before research involvement or activity. Analysis entails making meaning from data to provide answers to research questions posed or necessitated by the research action. Both analysis and data interpretation are interdependent. This research paper aimed to conduct data analysis in line with the research objectives outlined earlier. This entails stating research hypotheses, followed by data interpretation and the drawing of conclusions.

4.1. Research Statistics

Summarisation of samples and measures can also be ascertained through descriptive analysis of survey statistics, which can describe the basic nature of the data in a research study. Descriptive statistics describe quantitatively basic features of data.

4.1.1. Respondents' Profile

The respondent profile is enumerated in Figure 1 as per demographic categories such as age group, Family Type, and Age group of respondent children (Years). Respondents working in colleges or universities or Educational institutions, whether government, government-aided, or Self-Financing, are included, and the respondents must be female only. The data was collected using the instrument ‘Structured Questionnaire’. Individuals fill out the questionnaires. The number of accepted respondents is 961 out of the total number of respondents, 1050, and the accepted respondents ‘91.52%.

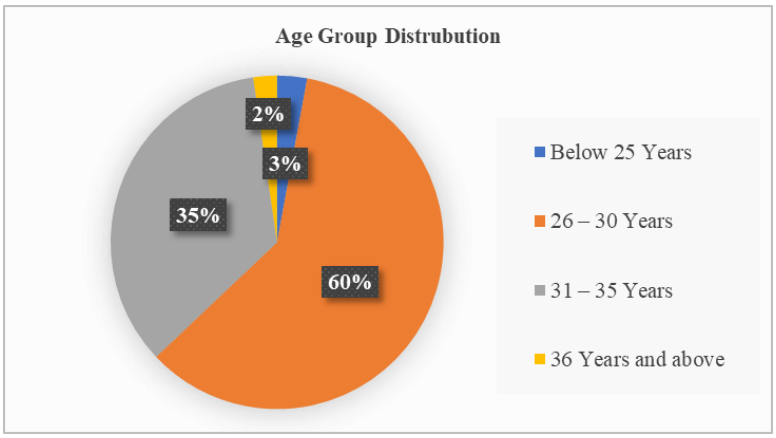

Figure 1: Profile of the age group

Bifurcations of the respondents based on the demographic variable, ‘Age Group’, were into four groups, viz. Below 25 years old, 26 to 30 years old, 31- 35 years old and 36 years old and above. The age group Bellow ‘25 years old’ was 28 by numbers and 2.91 by percentage, the age group ’26-30 years old’ constitutes 577 by numbers and 60.043 %, of the total respondents, then the age groups ’41-35 years’ and ’36 years and above’ respectively have numbers as 334 and 22 and represent34.76 % and 2.29 %. It is observed that the age groups ‘Below 25 Years’ and ’36 Years and above’ combined are 5.20 %, which is 50 out of 961 of the researchers in higher educational institutions. Fewer faculty members in these age groups are enrolling in research programs, either full-time or part-time. The profile of respondents on average monthly income is divided into four categories.

Order the respondents into family types of 'Nuclear', 'Joint' and 'Individual'. Nuclear family: the respondent and spouse, with or without offspring, living separately; joint family type: respondents living with spouse, parents, and other relations, with or without offspring; and individual type: the respondent living alone. The 'Nuclear' family type life style respondents are 677 in number and 70.55 percent, 'Joint' family type life style respondents are 271 in number, and 28.20 percent and 'Individual' type life style respondents are a very meagre number of 13 and 1.35 percent of the total researchers considered for the study. (Figure 2) illustrates the profile of a family and its type.

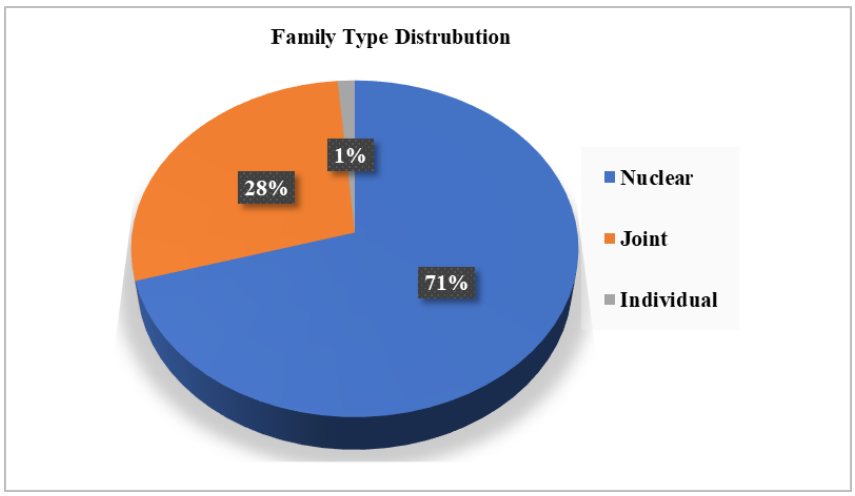

Figure 2: Profile of family type

Further analysing age group of children of the respondents into five categories as 'Children age bellow 2 years', 'Children age between 2 - 5 years', 'Children age between 5-10 years', 'Children age between 10-18 years' and 'Children age above 18 years', and also further category of Not applicable or not married 'also recorded. Respondents with children under 2 years old number 321, or 33.40 per cent of the total respondents. Similarly, respondents who have children below the age group between 2-5 years, between age group 5-10 years, between age group 10-18 years and above the age of 18 are recorded respectively 182, 41, 5 and 0 in numbers and respectively 18.94, 4.27, 0.52 and 0 in percentages. (Figure 3) elaborates on the profile of the age group of children.

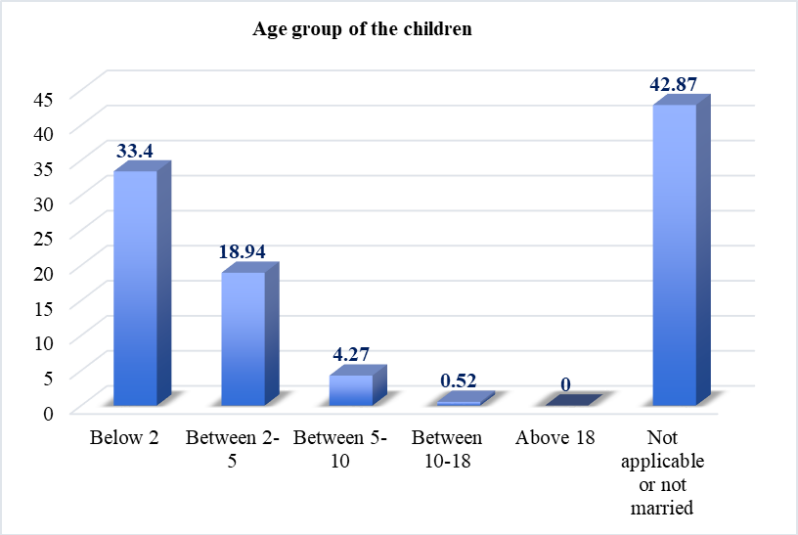

Figure 3: Profile of the age group of the children

4.2. Inferential Analysis

The differences in perception across various age groups, family types, and the age groups of children of research scholars are shown in Table 1. The differences between two groups in the means of variables and between more than two groups are analysed using Statistical tests, which are explained. The tests involve ANOVA Tests to test the hypothesis shown, and Correlation

Analysis. P-value or 'Sig value' or 'significant value' is used from the ANOVA outputs described in the Tables below to check whether the variation between certain means is statistically significant or not. To check whether certain variations between certain means are statistically significant or not, compare the P-value to the test for significance level denoted as α or alpha, which is set to 0.05 to test the null hypothesis. 'Significance level of 0.05' means that there is only a 5% probability of concluding that certain variation exists between certain means when, in fact, no variation exists between means. P-value ≤ α or 'significance level' or 'alpha' or 'alpha level.' This means that the difference between the means is statistically significant. P-value or 'Sig-value' or 'significant-value' is greater than α or 'significance level' or 'alpha.' This means that a certain variation between certain means is not statistically significant. P-value or 'sig-value' or 'significant-value' is greater than α or 'significance level' or 'alpha.' This also means that insufficient evidence exists to support the null hypothesis that the variation between means does not exist or that the means are equal.

4.3. Hypothesis I

Null Hypothesis (H_0): There is no significant difference in the means of the family type with respect to work-life balance determinants among women research scholars in higher education institutions.

Alternate Hypothesis (H_1): At least one sample mean differs from the others within the family type regarding work-life balance determinants for women research scholars in higher education institutions. The Family Type, as grouped for the survey, is classified into 'Nuclear Family', 'Joint Family', and 'Individual'. As indicated, the research scholars belonging to nuclear and joint-family types constitute 98.65 per cent of the respondents. The respondents who are part of the family type 'Individual' are a very small percentage of 1.35. An ANOVA test has been carried out to assess the significance of differences between Family Type ('Nuclear Family', 'Joint Family', and 'Individual') with respect to women research scholars in higher education institutions, and the results are listed. The P value for Career determinants is 0.776, Family responsibilities determinants is 0.145, Personal determinants is 0.387, Social determinants is 0.492 and Work Life determinants is 0.367 at a significance at 5% level (α = 0.05). Since the p-value is greater than 0.05, there is insufficient evidence to reject the null hypothesis. Also, it is concluded that there is no difference in perceptions of these determinants by Family Type for work-life balance among women research scholars in higher education institutions – research scholars across all qualification streams have the same viewpoint. To find out any significant relationship between the family type and the WLB. Based on the sample drawn, the p-value was estimated. Since the p-values are greater than 0.05 in all cases, it was concluded that there is no significant relationship between family type and WLB. The Null hypothesis is accepted.

Table 1: Summary of ANOVA for family type

Family Type	No.	variables	Source	SS	df	MS	F	Sig.
		Career	Difference between groups	5.203	4	0.867	0.543	0.776
				919.161	957	1.599		
Nuclear	677	Family	Difference between groups	15.456	4	2.576	1.597	0.145
				927.218	957	1.613		
Joint	271	Personal	Difference between groups	12.433	4	2.072	1.058	0.387
				1126.01	957	1.958		
individual	13	Social	Difference between groups	9.749	4	1.625	0.903	0.492
				1034.78	957	1.8		
		Work Life	Difference between groups	10.041	4	1.674	1.089	0.367
				883.313	957	1.536		

4.4. Hypothesis II

Null Hypothesis (H_0): There is no significant difference in the means of the age groups of children of women scholars regarding work-life balance determinants.

Alternate Hypothesis (H_1): At least one sample mean differs from the other image group of children of women research scholars with respect to work-life balance determinants in higher education institutions. The Age Group of Children is grouped for the survey and classified as 'Below 2 Years', 'Between 2-5 Years', 'Between 5-10 Years', 'Between 10-18 Years' and 'Above 18 Years'. Researchers who are not married have not been considered for the test of variance among the groups- they are excluded. ANOVA test has been carried out for significant difference between Age Group of Children's as 'Below 2 Years', 'Between 2-5 Years', 'Between 5-10 Years', 'Between 10-18' and 'Above 18 Years 'with respect to women research scholars in higher education institutions, and the results is listed in Table 2. The P value for Career determinants is 0.522, Family

responsibilities determinants is 0.421, Personal determinants is 0.401, Social determinants is 0.268 and Work Life determinants is 0.095 at a significance at 5% level ($\alpha = 0.05$). Since the p-value is greater than 0.05, there is insufficient evidence to reject the null hypothesis. Also, it is concluded that there is no difference in perceptions of these determinants among the Age Groups of Children with respect to work-life balance determinants of women research scholars in higher education institutions – research scholars from all qualification streams have the same perspective. To find out any significant relationship between the children's age and the WLF. Based on the sample drawn, the p-value was estimated. Since the p-values are greater than 0.05 in all cases, it was concluded that there is no significant relationship between children's age and the WLF. The Null hypothesis is accepted.

Table 2: Summary of ANOVA for age group

Years	No.	Variables	Source	SS	df	MS	F	Sig.
Below 2 years	321	Career	Difference between groups	0.631	4	0.631	0.41	0.522
				892.723	957	1.539		
2-5 years	182	Family	Difference between groups	1.052	4	1.052	0.648	0.421
				941.622	957	1.623		
5-10 years	41	Personal	Difference between groups	1.385	4	1.385	0.707	0.401
				1137.06	957	1.96		
10-18 years	5	Social	Difference between groups	2.213	4	2.213	1.231	0.268
				1042.32	957	1.797		
Above 18 years	0	Work Life	Difference between groups	5.352	4	5.352	2.793	0.095
				1111.42	957	1.916		
Not app	412							

4.5. Correlation Analysis

Correlation Analysis for Work-Life Balance Determinants: A correlation analysis of the determinants of work-life balance for women research scholars in higher education institutions is presented in Table 3. The determinants considered for the study are Career, Family Responsibilities, Personal, Social and Work Life. The correlation coefficient between Career determinant and Family Responsibilities is 0.591 (i.e. 59.1 % correlated), the correlation coefficient between Career determinant and Personal determinant is 0.616 (i.e. 61.6 % correlated), the correlation coefficient between Career determinant and social determinant is 0.554 (i.e. 55.4 % correlated), the correlation coefficient between Career determinant and Work Life determinant is 0.779 (i.e. 77.9 % correlated). The correlation coefficient between Family Responsibilities determinant and Personal determinant is 0.788 (i.e. 78.8 % correlated), the correlation coefficient between Family Responsibilities determinant and social determinant is 0.711 (i.e. 71.1 % correlated) and the correlation coefficient between Family Responsibilities determinant and Work Life determinant is 0.535 (i.e. 53.5 % correlated).

Table 3: Correlation coefficient for work-life balance determinants

Variables	Career	Family Responsibilities	Personal	Social	Work Life
Career	1.000	0.591	0.616	0.554	0.779
Family Responsibilities	-	1.000	0.788	0.711	0.535
Personal	-	-	1.000	0.722	0.612
Social	-	-	-	1.000	0.505
Work Life	-	-	-	-	1.000

The correlation coefficient between Personal determinant and social determinant is 0.722 (i.e. 72.2 % correlated), the correlation coefficient between Personal determinant and Work Life determinant is 0.612 (i.e. 61.2 % correlated) and the correlation coefficient between social determinant and Work Life determinant is 0 0.505 (i.e. 50.5 % correlated).

5. Conclusion

This research offers a deeper understanding of work-life balance among female research scholars in higher education institutions. Analysis of variance for ANOVA indicates that with respect to neither family structure variables nor age variables for children, scholars are not influenced, as 'p' values are above 0.05. This implies that scholars face the same challenges with work-life balance regardless of whether they come from distinct or the same families. Pearson correlation analysis demonstrated strong positive links among 'career', 'family responsibility', 'personal', 'social', and 'work-life' factors, revealing how

interrelated variables shape WLB. Such observations reveal that interventions or efforts directed at one variable can also promote beneficial outcomes for other variables. It becomes clear how support structures for working women, including work timings, childcare support, and mentoring programs, are essential for improving well-being and efficiency. This research offers valuable insight into gender equity debates and stresses that gender equity policies must acknowledge and address the complex work-life situations of academics that exist beyond gender. This issue can also be studied in terms of qualitative or other regional differences for further insight.

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