



An Analysis on the Main Factors of Occupational Stress among Indian Women – A Soft Computing Approach

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Abstract-Work and family are the two most important aspects in women's lives. Balancing work and family roles have become a key personal and family issue for many societies. There are many facets in working mother's lives that subject to stresses. They deal with home and family issues as well as job stress on a daily basis. Imbalance between work and family life arises due to a number of factors. Various factors appear to strengthen the brunt of pressure on women. Stress experienced by women at a workplace affects not only their professional life, but also family life and social intercourses. In the women's opinion, an unpleasant workplace is such a workplace where the feeling of mental workload is connected with the lack of rewards (motivation), uncertainty resulting from organization of daily chores and lack of support from others. The high general level of stress was noted among the group of women working in IT sectors as well as among those who perform physical work (seamstresses). No significant dependencies were concluded between socio-demographic variables and the general level of exposure to intensified stress in the examined professional groups. The above research confirms the need for further examination of the working environment of women and its impact on health. Obviously, attempts should be made in order to improve the conditions of work for women, bearing in mind the fact that the adoption of neutral attitude towards the sexes when assessing risk and undertaking preventive activities may result in the female gender being underestimated or even disregarded. Regarding to woman's household tasks and families responsibility, it is important to measure the level of occupational stress in working women and assess relation between occupational stress and family difficulties in order to obtain knowledge for health care providers to provide support to the working women and their families. There is a great need for research on working women, especially concerning the impact and occurrence of job stress on children mental health. Longitudinal data on young childbearing families are needed to examine the complex issues of work-family surrounding the family in today's world. The purpose of this analysis is the evaluation of women's exposure to stress-inducing factors at work and definition of a scale of the problem. The research was conducted on different professional groups of women. The research tool was the standardized questionnaire for Subjective Work Evaluation. The raw result was obtained on the basis of summing up all the points. The results of stress factors were quoted as mean results of raw values and were referred to results defined as high for a given factor. The results obtained were analyzed using a soft computing technique.

Keywords- Occupational Stress, Stress Factors for Women, Soft Computing Technique.

I. INTRODUCTION

Balancing work and family roles has become a key personal and family issue for many societies. Work and family are the two most important aspects in people's lives and, contrary to the initial belief that they are distinct parts of life; these domains are closely related. In all countries the economic development requires an integration of both male and female labor forces [2]. That is men and women both have to contribute to development process of the country as the labor of women contributes to economic growth and poverty reduction. Traditionally, the major responsibility of women has been perceived to be the maintenance of the family including home and childcare and breadwinning was the main responsibility of men. However, with more and more women entering the workforce and pursuing careers, these clearly defined gender roles were forced to change. Most women do not have responsibility only in one domain anymore; they have to balance the competing demands of both work and family domains. In the present study the term occupational stress defined as a disorder associated with a job or work [1]. The anxiety may be expressed in the form of extreme tension and anxiety and the development of physical symptoms such as headache or cramps, also called occupational neurosis. This is caused by worry or anxiety at work when a person feels that the demands and pressures of their job are more than they can handle. Stress at work can cause major damage to one's health and overall lifestyle and it is an area that should not be ignored. Family difficulties are miss interaction with family members that involve physical, emotional and psychological problems. Working mothers, as a label, refers to women who are mothers and who work outside the home for income in addition to the work they perform at home in raising

their children.

Family stress theory can be applied to critical work events that negatively affect the family, such as job loss and to chronic work stressors such as role overload, instability, job dissatisfaction, inadequate child care and shift work. 'Families' and 'employment' are inter-related and socially constructed. The functionalist theory of the 'modern' (or 'standard') family was a key element of the 'orthodox consensus' that emerged in sociology after the Second World War and persisted until the 1970s and even the 1980s. This model viewed the family as an institution that fulfilled universal prerequisites for the survival of human societies. The smooth functioning of societies depended on the proper articulation of the interdependent parts. Therefore change in societies, will go along with change in families in order to meet new needs.

There are many facets in working mother's lives that subject to stresses. They deal with home and family issues as well as job stress on a daily basis. Imbalance between work and family life arises due to a number of factors [3]. Various factors appear to strengthen the brunt of pressure on women. Frequently household duty involves protecting family members: children, the sick and the elderly. Even where men play role in the caring function, usually it is the woman who is the initial carer, although she may suffer additional health risks. 'Work-family spillover' is result of the performing multiple roles and this will be accused when the demands from family and home life, interfere with women's ability to perform effectively in the workplace. Having to juggle multiple roles and effect of the pressures from work on one's attitude and behavior within the family also may lead to 'work-family spillover'.

Because of difficult situation caused by occupational stress, there are many mothers that would like nothing more than to give up work and spend their time raising their family as best they can. However, financial problems can create a real obstacle here and many mothers find themselves having to go back to work in order to help maintain the family budget. For single mothers in particular, a return to work after having a child is often a necessity. There are a number of problems that working mothers can face: Difficulties with finances, Getting to spend time with the kids, Keeping on top of the housework, Dealing with sickness, Quality time for yourself, Personal illness and stress.

While much research has been conducted on the occupational stress in men, little research has examined the occupational stress in working mothers and the effect of these stresses on their families. The current study mainly aims at demonstrating job situation for working women and stresses and difficulties that women experience. Working women have to resolve occupational stresses by promoting effective management practices, improving interpersonal relations at both profession and home.

This study has the potential to provide insight needed by healthcare providers, employers of companies/firms and organizational psychologists to decrease occupational stress of working women and prevent family difficulties caused by those stresses. The main research question is which age group of working women is most affected by occupational stress.

II. LITERATURE REVIEW

Stress refers to the generalized, patterned, unconscious mobilization of the body's natural ability. Stress at study is a growing problem for all workers, including women. Furthermore, in women levels of stress-related illness are nearly twice as high as for men.

Occupational stress is defined as the harmful physical and emotional responses that occur when the requirement of the job do not match the capabilities, resources or needs of the worker. From that definition, Occupational stress is chronic conditions caused by situation in the workplace that negatively affect an individual's job performance and their overall wellbeing. Many job conditions caused stress among women. These job conditions include little control over work; role ambiguity and conflict; poor relationships with coworkers and supervisors; heavy workload demands; job insecurity and work that are narrow, repetitive and monotonous. Work and family balance issues, also can be stressors for women in the workplace. On the other hand job stress has been linked with depression, musculoskeletal disorders, cardiovascular disease and burnout.

Several researches have indicated that work-family difficulties can make negative influence for individual mentality and physiology. Studies have shown that, compared with their male counterparts, women report higher level of stress in work/family conflicts, gender barriers and career development. Zhan studied the sources of work stress among women academics in research universities of China. Based on the results of her study, firstly, women academics perceived the demands for career development as highly stressful. The main career challenges for them include the need for renewing knowledge, lack of research productivity and slow career progress. Secondly, gender related barriers increased pressure on women academics. Finally, women academics experienced more difficulties in fulfilling both academic work and family roles. The main conflict situations pertained to "performing both work and family roles very well," "children's education and future" and "lack of time to satisfy personal interests and hobbies."

In another study Ugwu investigated the multiple role stress sandwich generation female employees experience both at home and at the workplace and how they cope with such stress. 147 sandwich generation women participated in his study. Results showed that sandwich generation women that receive care giving supports either from their husbands or from house-helpers experience less stress than their counterparts without such care giving supports and sandwich generation women who cared for the sick aged parents experience more stress than their counterparts who care for healthy aged parents. Sandwich generation female employees who

provide care giving services to large families did not differ from their counterparts in the normal family size on measures of multiple role stress.

Another study conducted by Fang et al. examined 121 Chinese professional women on work-family conflict and their stressors. The result showed that professional women's self-role perceived and social -role perceived have conflicts; education, incoming ratio, professional experience can influence the stress; domesticity satisfaction, family activity, spouse stress, work devotion and work load are stressors of professional women's work-family conflict.

Similarly, Abdullah et al. assessed occupational stress, social and family difficulties and job contentment of working women in Bangladesh. The study contained the information and situation on working women, the hazards and occupational strains they face at work and in family life in many developed and developing countries including Bangladesh. Besides, this study has also tried to illustrate where the difficulties are and how far these for working women can be solved by giving them emotional sustenance, voicing against the long standing harassment of women and advocating equality for them.

Lu also examined the impact of work-family conflict and the effects of organizational support on working women in Taiwan. 441 women (aged between 15 and 64 years) in paid employment working in three public universities in northern Taiwan formed the sample population for this research. The findings showed that work-family conflict was strongly linked with lower job and family satisfaction, greater stress and more severe physical ailments. Implementing family-friendly policies and creating a supportive work environment can help working women to manage their work-family conflict and improve their health outcomes.

III. METHODOLOGY

The study was carried out with 100 women in Salem. Samples were interviewed in places where they normally spend time e.g. home, educational institutions, shopping mall, recreation club and internet browsing centers etc., to avoid interviewing them in their workplaces since they may hesitant to give their opinion. The interview framework was set in advance and scheduled for one hour, but some questions were adapted to individuals during the session. In order to grasp a general feeling about their occupation and family, interviews were informal and toned like a friendly chat. Several types of data were collected. Later the data collected were analyzed with user-centered methods.

Participants: 100 numbers of female aged 21-32, took part in the study. All are born into the lower, middle and upper-class and living in Salem, Tamil Nadu, India. Also they are all attending fulltime job in and around Salem.

IV. MATERIALS AND METHODS

A. Materials

This was a women-based study with a cross sectional design, evaluating all women in the age group of 21-32. Sample size is totaled to 100. The instrument used was an interview targeting the working women. The interview was designed to include items related to the reasons for stress given by the participants. The instrument was applied to each participant. Women in different age group in different parts of Salem, Tamil Nadu took part in the study.

B. Primary Reasons for Stress

The outcome used in the data analysis was primary reasons for occupational stress among working women. The following are the primary reasons given by the working women in the age group of 21-32.

- Feeling of mental burden
- Lack of rewards
- Feeling of insecurity and uncertainty caused by organization
- Social Contacts
- Physical discomfort
- Unpleasant Conditions
- Lack of Control and Support
- Feeling of responsibility

These reasons are hereafter referred as S1, S2, and S3...S8 respectively.

The women were divided into three age groups as 21-24, 25-28, and 29-32. Then, the total number of working women for each reason in each age group is found out and tabulated.

C. Methods

The initial raw data matrix is formed by taking these factors as the columns and the age groups of women in years 21-24, 25-28 and 29-32 as the rows. The analysis of the primary factors of stress is a five-stage process [4].

In the first stage, the raw data is represented as a matrix. Entries corresponding to the intersection of rows and columns are values corresponding to responses from the participants for the interview. The 3 x 8 matrix (Number of age groups is 3 & Number of primary reasons is 8) is uniform i.e., the number of individual years in each interval is the same.

In the second stage, in order to obtain an unbiased uniform effect on each and every data so collected, transform this initial matrix into an Average Time Dependent Data (ATD) matrix. The ATD matrix is obtained by dividing each entry with the interval of years in the corresponding age group (i.e., 4).

To make the calculations easier and simpler, in the third stage using the simple average techniques convert the above average time dependent data matrix into a matrix with entries $e_{ij} \in \{-1, 0, 1\}$. This matrix is named as Refined Time Dependent data matrix (RTD) matrix or as the fuzzy matrix. The value of e_{ij} corresponding to each entry is determined in a special way as follows.

If $a_{ij} \leq (u_j - \alpha * \sigma_j)$ then $e_{ij} = -1$
 Else if $a_{ij} \in (u_j - \alpha * \sigma_j, u_j + \alpha * \sigma_j)$ then $e_{ij} = 0$
 Else if $a_{ij} \geq (u_j + \alpha * \sigma_j)$ then $e_{ij} = 1$

Where a_{ij} 's are the entries in the ATD matrix, u_j is the average and σ_j is the standard deviation of the j^{th} column.

At the fourth stage, using the fuzzy matrices, we obtain the Combined Effect Time Dependent Data matrix (CETD), which gives the cumulative effect of all these entries. In the final-fifth stage, we obtain the row sums of the CETD matrix. The tables given are self-explanatory at each stage. The graphs of the RTD matrix and CETD matrix are given.

D. Analysis

• First Stage

Initial raw data matrix with women age group as the rows and prime reasons of stress (S1, S2... S8.) As the columns is as follows.

TABLE 1. FIRST STAGE

Age Group	S1	S2	S3	S4	S5	S6	S7	S8
21-24	26	19	21	16	14	14	18	9
25-28	15	34	19	24	23	19	25	14
29-32	33	23	40	31	39	25	35	27

• Second Stage

The ATD matrix is calculated as follows. (Dividing each entry with the interval of age group i.e. 4)

TABLE 2. SECOND STAGE

Age Group	S1	S2	S3	S4	S5	S6	S7	S8
21-30	6.50	4.75	5.00	4.00	3.50	3.50	4.50	2.25
31-40	3.75	8.50	4.75	6.00	5.75	4.75	6.25	3.50
41-50	8.25	5.75	10.00	7.75	9.75	6.25	8.75	6.75

The Average and Standard Deviation of the above ATD matrix is

TABLE 3. STANDARD DEVIATION

Average	6.17	6.33	6.58	5.92	6.33	4.83	6.50	4.17
Standard Deviation	2.27	1.94	2.96	1.88	3.17	1.38	2.14	2.32

- *Third Stage*

The RTD matrix for $\alpha = 0.15$ is

0	-1	-1	-1	-1	-1	-1	-1
-1	1	-1	0	0	0	0	0
1	-1	1	1	1	1	1	1

The ROW SUM matrix is

-7
-1
7

The RTD matrix for $\alpha = 0.30$ is

0	-1	-1	-1	-1	-1	-1	-1
-1	1	-1	0	0	0	0	0
1	-1	1	1	1	1	1	1

The ROW SUM matrix is

-7
-1
6

The RTD matrix for $\alpha = 0.45$ is

0	-1	-1	-1	-1	-1	-1	-1
-1	1	-1	0	0	0	0	0
1	0	1	1	1	1	1	1

The ROW SUM matrix is

-7
-1
7

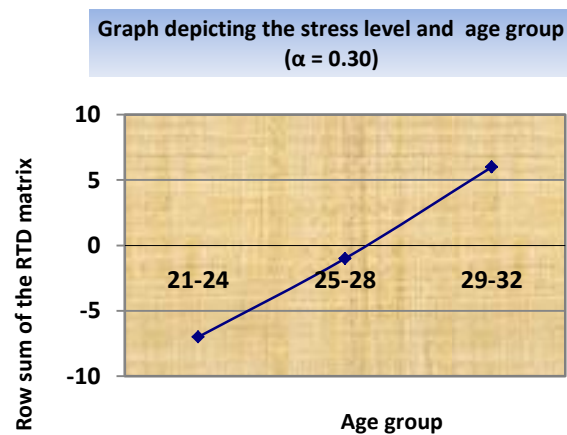
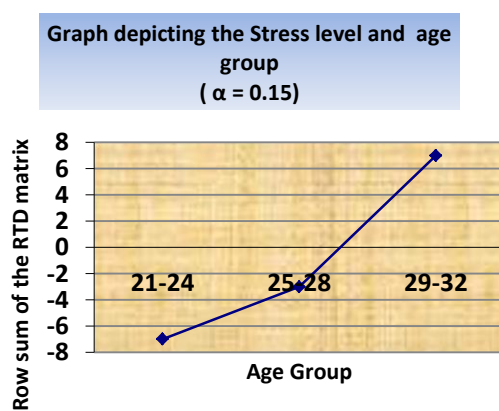
The RTD matrix for $\alpha = 0.75$ is

0	-1	0	-1	-1	-1	-1	-1
-1	1	0	0	0	0	0	0
1	0	1	1	1	1	1	1

The ROW SUM Matrix is

-6
0
7

Now the results are shown in graphs



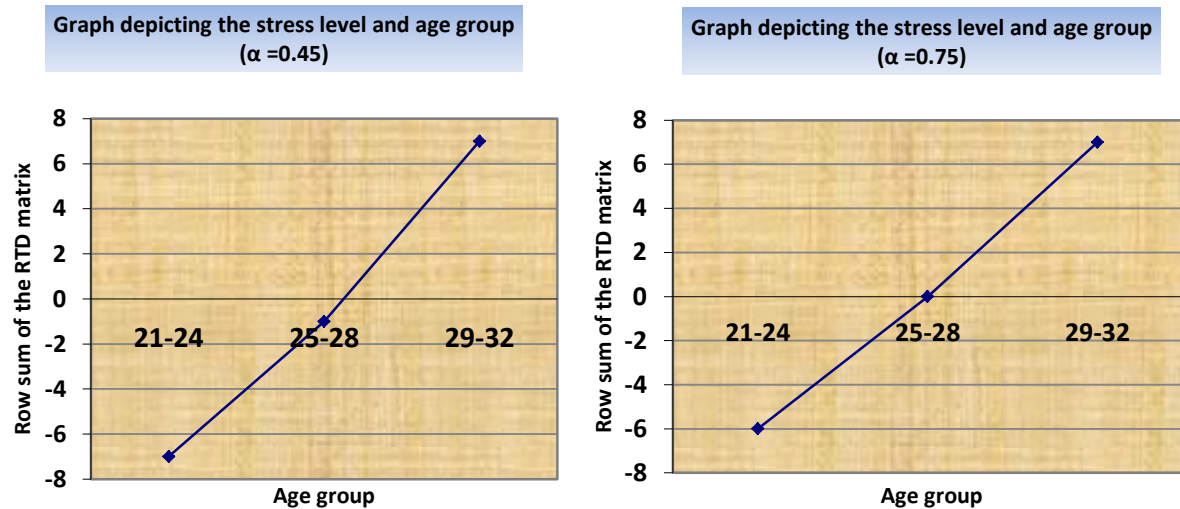


Figure 1. Examples of stress level based on age group

- *Results*

The following graph shows the results of the analysis of stress levels of different age group due to different primary reasons for various values of α .

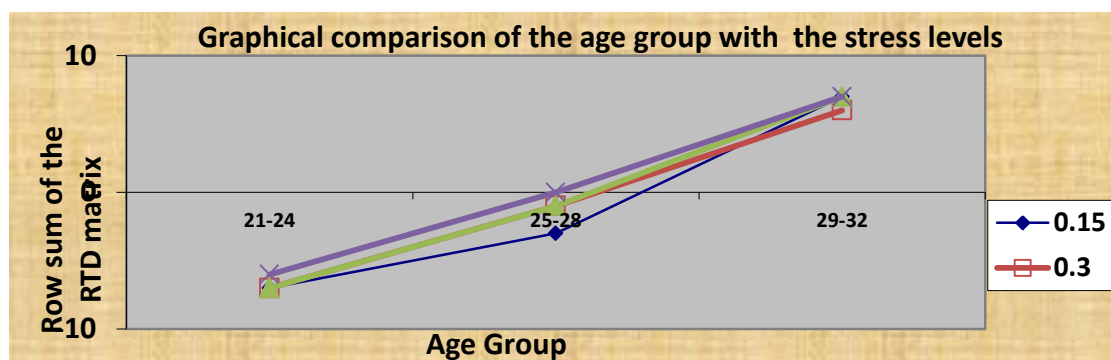


Figure 2. Results

From the above analysis, we observe that the stress level is the highest in the age group of 29 to 32 and it **was not changed** with the change in the value of the parameter α from 0 to 1.

The mathematical inference is that the age group of working women with high level of stress is 29 to 32.

- *Fourth Stage*

The Combined Effect Time Dependent data matrix also confirms the same result.

This matrix is the cumulative sum of all the entries in the RTDs. The CETD matrix is

0	-4	-4	-4	-4	-4	-4	-4
-4	4	-4	0	0	0	0	0
4	-4	4	4	4	4	4	4

- *Fifth Stage*

The Row Sum Matrix for CETD is

-28

-4

24

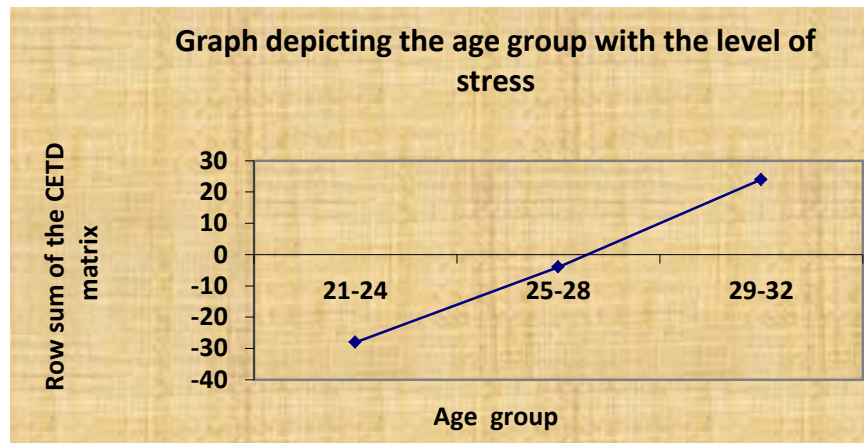


Figure 3. Age group with the level of stress

From the raw data matrix, the following graph is plotted which gives the percentage of working women in each age group for each of the primary reasons.

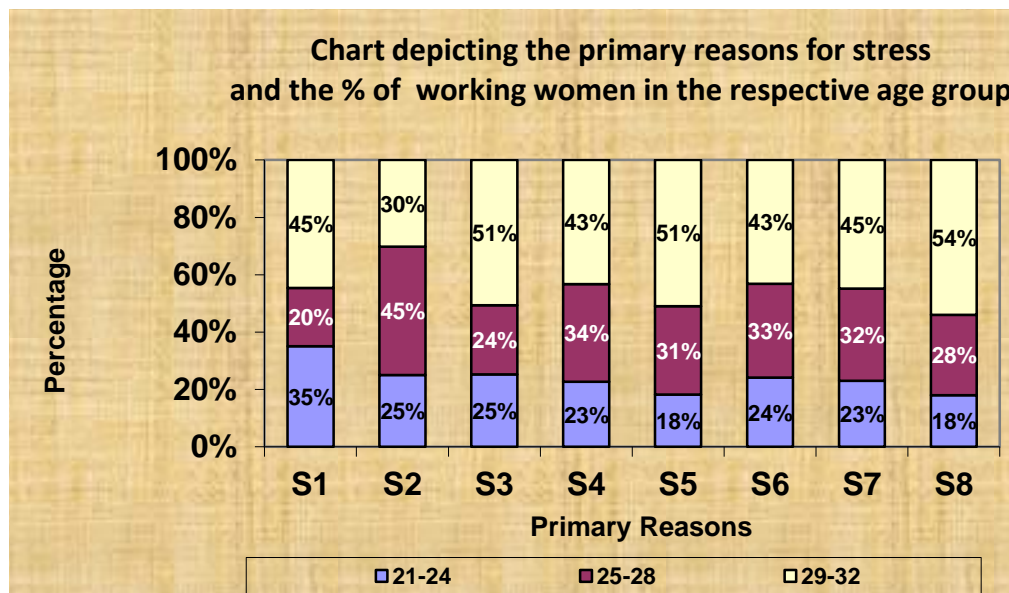


Figure 4. Comparison of primary reasons for stress and the percentage of working women in the respective age group

The following graph gives the percentage of individual reasons for stress in the different age group.

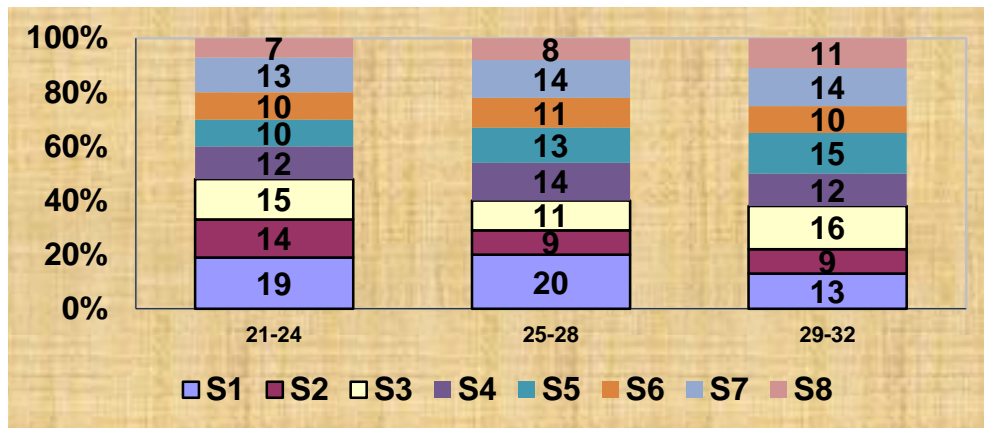


Figure 5. Percentage of individual reasons for stress in the different age group

V. CONCLUSION

Stress experienced by women at the workplace affects not only their professional life, but also family life and social intercourses. In the women's opinion, an unpleasant workplace is a workplace where the feeling of mental workload is connected with the lack of rewards (motivation), and uncertainty resulting from organization of daily chores and lack of support from others. A high general level of stress was noted among the group of women working in the age group of 29-32. No significant dependencies have been concluded between socio-demographic variables and the general level of exposure to intensify.

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