

RESEARCH TRENDS ON OCCUPATIONAL STRESS OF FEMALE EMPLOYEES: A BIBLIOMETRIC ANALYSIS

Nafia Sultana^{1*}, Anusuiya Subramaniam² and Wong Foong Yee²

¹*School of Graduate Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.*

²*School of Business & Economics, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia.*

*Corresponding author's e-mail: gs61192@student.upm.edu.my

Received: 22 September 2022

Revised: 22 January 2023

Accepted: 7 February 2023

Online first: 31 March 2023

ABSTRACT

The study aims to examine the research trends on occupational stress of female employees between the period of 1973 to 2022 using bibliometric analysis. A total of 508 research documents have been analysed in the study. A systematic process flow has been followed to extract the research documents from the Scopus database. The findings from the analysis showed that the research trends on occupational stress of female employees have ups and downs since the beginning. Based on the highest publications to the related research on occupational stress of women, Finland has been placed as the most productive country, followed by the United States, Sweden and United Kingdom. The most active authors are Kivimäki, Vahtera J and Virtanen in terms of number of publications and number of total citations. Several future research areas have been identified from the results of the VOSviewer networking map. It is found from the growing number of author keywords in the literature are stress, gender, mental health, occupational health and working conditions which have potential literature gaps to work on in future. The results of the study have also opened a new avenue for the future researchers and industry practitioners to work on occupational stress related issues to understand the cause and consequences of it.

Keywords: *occupational stress, women, female employees, bibliometric, mapping*



INTRODUCTION

Occupational stress has been drawing the attention of academics, researchers, and industry practitioners over the last few decades (Uddin, 2020). Occupational stress has been considered as a vital issue due to the fact that it can detrimentally affect the individual and organisational outcomes (Falconier *et al.*, 2015). Furthermore, it is assumed that occupational stress is linked with reduced productivity, increased absenteeism, high turnover rate, work-family conflicts, and scratched organisational performance (Armstrong *et al.*, 2015; Uddin, 2020). Scholarly attention regarding the occupational stress of female employees has also been increased worldwide (Babore *et al.*, 2020) as female participation in workforce is increasing and employees with less occupational stress are likely to be more productive, satisfied with their job and lives, and less likely to show turnover and absenteeism in the workplace (Kwok *et al.*, 2015). Therefore, there is a need to consider occupational stress in a serious manner to examine the overall scenario of workplace. It is important to identify the causes and consequences of occupational stress so that a productive and effective workforce can be ensured for the economy. The research in occupational stress of women was initiated in 1973 by Henning, G. The research entitled women's work from the point of view of the company physician was conducted during the initial examination by the researchers. Since then, the term has been widely used among researchers to further investigate the pattern of occupational stress of female employees. Thus, the ultimate objective of this study is to examine the research trends on occupational stress of women between the period 1973 until 2022 using bibliometric analysis.

Bibliometric analysis is a quantitative method used to review the knowledge, structure and development of particular research fields based on the analysis of previous related publications (IGI Global, 2018). Researchers (Rodrigues & Franco, 2022) conducted a bibliometric study on work stress of accounting professionals and identified few strategies to avoid stress at workplace. Bibliometric analysis also allows the researchers to do network analysis on the keywords and titles. Such analysis also helps to develop the cluster-wise investigation in any specific research field. On the other hand, mapping and network analysis provide a detailed summary of authorship, sources and citations of the previous literatures. Here, present study is designed to answer the following research questions:

- RQ1. What are the current states and trends of publications with regards to the occupational stress of women?
- RQ2. What are the highly cited documents in occupational stress research?
- RQ3. Who are the most productive contributors in occupational stress research in terms of authors, countries, institutions and source titles?
- RQ4. What are the current states of knowledge structure in terms of collaboration and co-occurrences network in occupational stress research?

The paper is structured as follows. The first section describes the literature review development in the field of the occupational stress in general, followed by the second section, which explains the methodology adapted for the present study. The third section explains the results and findings of the relevant bibliometric indicators. A number of tables, figures and flowchart to conduct bibliometric analysis are presented in this section. Finally, the last section summarises discussions, the future research direction, and the limitations of this study.

LITERATURE REVIEW

Occupational Stress

Occupational stress refers to the form of responses that people exhibit when they face an incongruence between the skills, abilities they have and the requirements they need to fulfill for their jobs (Jayakumar *et al.* (2020). Now a days, occupational stress has become a customary spectacle among organisational members (Daniel, 2015). World Health Organization (WHO) defined occupational stress as the reaction people demonstrate when they are challenged with job demands which are not aligned with their knowledge, capacities, and thus, encounter their capacity to handle the situation (Mahipalan & Sheena, 2019). Occupational stress has been conceptualised by Unites States' NIOSH (1999) as the undesirable physical and emotional responses that takes place when the job requirements do not match the skills, resources or needs of the employees. Regrettably, occupational stress has become a widespread experience faced by majority of the employees of modern organisations (Daniel, 2015) and such occupation related stress can

result in poor health and psychological grievances (Saxena *et al.*, 2020). Researchers opined that occupational stress is a strong reason of work-related sicknesses and injury (Hassan *et al.*, 2020). World Health Organization (WHO) defined occupational or job stress as the reaction people may have when they are presented with work demands and challenging assignments that are not aligned with their knowledge, capacities, and thus, test their capability of handling the situation (Mahipalan & Sheena, 2019).

Based on the previous research (Upadhyay & Singh, 2017), men and women may experience occupational stress in different ways for several reasons. For example, female employees are commonly involved in low-paid, monotonous, and high demand jobs that are basically stressful for them (Uddin, 2020). Apart from these, female employees may also experience other stressors like stereotypical gender attitude, the glass ceiling effect, gender discrimination, conventional societal values, lack of empowerment in their jobs, and male dominant organisational culture and all these stressors obstruct the career development of women (Uddin *et al.*, 2020). The unfair practices can generate gender disparities through vertical and horizontal segregation and discrimination of male and female employees in the workplace (Charles, 2003; Thunman, 2015). Studies also showed the existence of variances between the stress experienced by women and men although they hold the similar organisational positions (Thunman, 2015). From a psychological viewpoint, this difference has been explained in terms of emotional barriers that distinguishes women from men, which in turn tend to cause higher levels of stress for women (Thunman, 2015). Powerlessness, uncertainty, lack of self-confidence, weakening of motivation are certain significant stressors among the female employees (Kanter, 1977) along with the existence of glass ceilings (Thunman, 2015).

Past Studies

Previous studies have been conducted on occupational stress issue, particularly that of female employees. Several studies have emphasized on the stressors under which female employees work and how these stressors are often considered as the consequences of masculinity and gender-related stereotypes (Uddin *et al.*, 2020). Studies on occupational stress of female employees have been conducted over time on different working sectors. For instance, working women involved in frontline services such as banking

and private hospitals are found to suffer from occupational stress primarily because of the organisational and interpersonal issues (Azad, 2014; Kumari, 2014). Yet again, another ground of research has made a connection between work stress and the working conditions of female employees in the health care and education segments (Thunman, 2015).

However, researchers (Shortland & Altman, 2011) revealed that career, family and financial restraints often put female employees who work in large multi-national organisations into less favourable organisational positions. Researcher (Tzeng, 2006) exposed that female employees need to deal with gender stereotypes when performing their tasks in organisations. Although the organisations in western contexts are more vigilant of discrimination issues than organisations in non-western settings (Thunman, 2015), in Asian organisations female employees need to learn two types of culture to meet the gaps in cultural values (Cheung & Halpern, 2010; Tran, 2016). They faced occupational stress mostly generated by traditional gender culture and work-life balance (Cho *et al.*, 2018).

Conservation of Resources (COR) Theory

One of the dominant theories developed in the occupational stress literature over the years is the Conservation of Resources (COR) theory (Hobfoll, 1989) and to date, individual researches as well as meta-analyses have found COR theory to be a key explanatory model for understanding the stress at work (Westman *et al.*, 2004). Conservation of Resources (COR) theory is both a stress and motivational theory that outlines how individuals are likely to be impacted by stressful situations at workplace, what kind of stressful situations are likely to be faced by them and how people act to save and protect their resources (Westman *et al.*, 2004). However, COR theory suggests that since people have limited resources (Halbesleben *et al.*, 2014), it makes resource loss stressful for them and it can also unpleasantly impact individuals' well-being and job performance (Boyce *et al.*, 2013; Xanthopoulou *et al.*, 2009). Westman *et al.* (2004) opined that work demands, work and home requirements, burnout, multiple role conflicts, and impact of the glass ceiling on women and minorities are some of the research topics where COR theory can be applied to address occupational stress.

METHODOLOGY

It is evidently important to clarify the method of any study conducted (Rahman *et al.*, 2022). Present study applies the bibliometric analysis method to analyse the research trends on occupational stress of female employees published by researchers across the world using Scopus database from 1973 to 2022.

The term ‘bibliometric’ was first coined by Faithorne in December 1969 that describes the statistical evidence about the published articles in a particular area or research field through the highlighting of the precise concepts, studies, trends, methods, keywords, citations, sources of scientific publications and so on (Babore *et al.*, 2020). Scholars (Iftikhar *et al.*, 2019) stated that bibliometric analysis is a statistical assessment of published research articles, books, or book chapters. This quantitative method uses statistical analysis to assess the information of published documents (Sweileh, 2017) and allows the researchers to record, examine and disseminate the metadata information to the readers (Rahman *et al.*, 2022). Hence, literature review using bibliometric analysis lets researchers to strengthen their understanding on the body of knowledge in any field.

Present study uses bibliometric analysis to present an in-depth information on the current trends of occupational stress of female employees based on indicators such as research productivity, type of document and source, subject area, publication language, country of publication, author keywords, authorship and citation metrics etc. Scopus database is used to access its bibliometric data as Scopus provides the flexibility to search across a diversified bibliographic area (Hassan & Ahmi, 2022). On the other hand, VOSviewer is used to visualise the bibliometric information and networking regarding the significant terms taken from a body of scientific literature.

Defining Keywords

Selecting the correct keywords is an important part in conducting the bibliometric study. Based on the purpose of the study, the researcher used the following keywords: occupational stress, female employees, women. Using these main three keywords: the researcher can find multiple combinations of the keywords such as (1) occupational stress; (2) occupational stress and

female employees; (3) occupational stress and women etc. As such, the following query was conducted: TITLE-ABS-KEY ((Occupational Stress) AND (Female Employees) AND (Women)).

Search Strategy

Present study considered the online Scopus database to get a pool of documents published in occupational stress of female. Scopus online database was selected in this study because it is recognised as the largest citation and abstract database in fields like technology, social science, business, and management (Fahimnia, 2015). Majority of the peer-reviewed articles published in this Scopus online database usually come from leading academic publishers such as Emerald, Elsevier, Springer, Inderscience, and Taylor and Francis Group etc (Rahman *et al.*, 2022). Initial search TITLE-ABS-KEY (Occupational Stress) has produced a total of 37,430 documents and within the refined search TITLE-ABS-KEY ((Occupational Stress) AND (Female Employees) AND (Women)) has produced 508 documents. Figure 1 illustrates the detailed steps for the search strategy involved for bibliometric analysis of the study.

Tools for Data Analysis

To understand the research trends on occupational stress of female employees through bibliometric analysis, the study used VOSviewer (1.6.18). This software was developed by developed by Nees Jan van Eck and Ludo Waltman at Leiden University's Centre for Science and Technology Studies (CWTS), with the focus on constructing and visualising bibliometric networks.

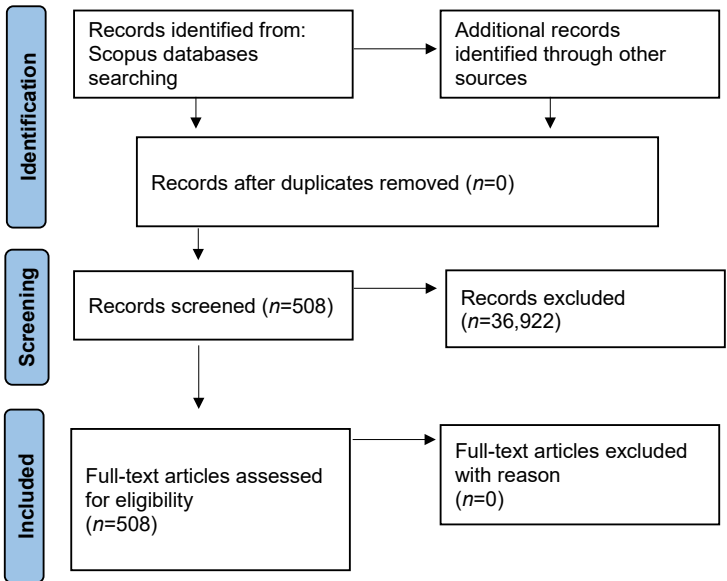


Figure 1: Flow Diagram of the Search Strategy

EMPIRICAL RESULTS

Descriptive Analysis

This section describes the research trends on occupational stress research including all information on the current state of publications, highly cited papers, most productive authors, countries and institutions, publication sources and the types and sources of publications etc. The 508 documents were analysed, and majority of the findings were presented as frequency and percentage.

Research Productivity

Table 1 shows the annual publication trends with the details of total publication, number of cited publications, total citation, citation per document and citation per cited documents from the year 1973–2022. Based on the bibliometric data gathered from Scopus, the highest total publication in the field of occupational stress of women is in the year 2019 with a total

number of 35 article. However, only 25 articles were cited from 2019 with total 274 citations. Besides, only 18 publications were published in the year 2006 but received the highest total citations of 2586. Among the 18 articles, 17 papers have been cited in 2006. Moreover, in the year 2005 only 18 articles were published, and all these papers were with second highest citation number with a total 2138 citations.

Table 1: Annual Publication Trends

Year	TP	%	NCP	TC	TC/TP	TC/NCP	<i>h</i>
2022	10	2%	5	24	2.4	4.8	3
2021	23	5%	11	35	1.52	3.18	4
2020	25	5%	24	238	9.52	9.92	9
2019	35	7%	25	274	7.83	10.96	9
2018	30	6%	28	327	10.9	11.68	11
2017	24	5%	23	225	9.38	9.78	9
2016	22	4%	22	504	22.91	22.91	12
2015	30	6%	30	1035	34.5	34.5	12
2014	19	4%	19	437	23	23	12
2013	21	4%	21	440	20.95	20.95	11
2012	25	5%	24	1086	43.44	45.25	18
2011	22	4%	22	512	23.27	23.27	14
2010	14	3%	14	553	39.5	39.5	13
2009	23	5%	23	776	33.74	33.74	16
2008	17	3%	17	641	37.71	37.71	12
2007	18	4%	18	858	47.67	47.67	14
2006	18	4%	17	2586	143.67	152.12	15
2005	18	4%	18	2138	118.78	118.78	14
2004	24	5%	23	1145	47.71	49.78	17
2003	12	2%	12	669	55.75	55.75	8
2002	13	3%	13	1395	107.31	107.31	11
2001	4	1%	4	240	60	60	4
2000	7	1%	7	642	91.71	91.71	6
1999	6	1%	6	383	63.83	63.83	6
1998	5	1%	4	211	42.2	52.75	4
1997	7	1%	7	427	61	61	5

1996	2	0%	2	107	53.5	53.5	2
1995	5	1%	5	313	62.6	62.6	3
1994	3	1%	3	317	105.67	105.67	2
1993	2	0%	2	47	23.5	23.5	2
1992	5	1%	4	45	9	11.25	3
1991	5	1%	5	191	38.2	38.2	5
1990	2	0%	2	88	44	44	2
1989	1	0%	1	78	78	78	1
1988	5	1%	4	169	33.8	42.25	3
1987	1	0%	1	15	15	15	1
1984	1	0%	1	190	190	190	1
1981	1	0%	1	28	28	28	1
1979	2	0%	2	10	5	5	2
1973	1	0%	0	0	0	0	0

TP = Total number of publications, NCP = Number of cited publications, TC = Total citations, TC/TP = Average citations per publication, TC/NCP = Average citations per cited publication, $h = h$ -index

Figure 2 represents the total number of documents published each year. The graph demonstrates that the first research article on occupational stress was published in 1973. The research was conducted by Henning G. with the title “Women’s work from the point of view of the company physician.” The growth of the related publications has been started from 1989 and then risen gradually in year 2004, 2009, 2012 and 2015. However, there was also small decrease of research on the related field in between. Maximum number of publications have been indexed in Scopus database in the year 2019. Even in the mid of year 2022, 10 publications have already been indexed in Scopus database.

Documents by year

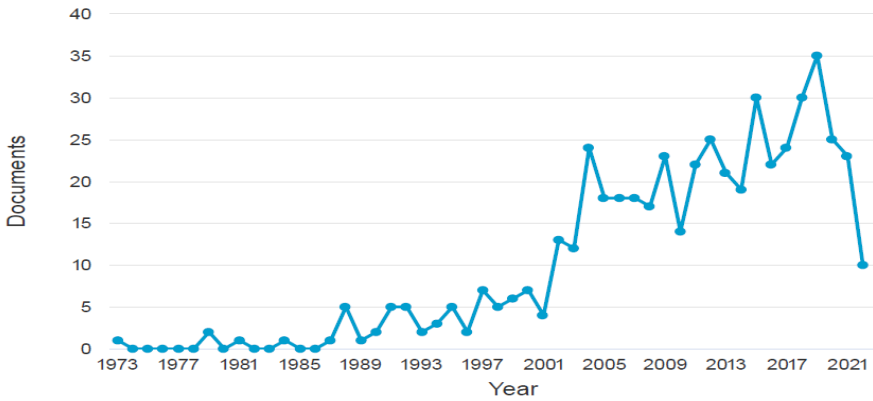


Figure 2: Annual Publication Trends

Types of Documents and Sources

Collected data was analysed to classify the types of documents and sources. Different types of documents include articles, conference papers, reviews, book chapters while the types of sources are generally journals, conference proceedings, books etc. Table 2 indicates the types of documents published. There are five types of documents that have been published on topics relating occupational stress of female, such as article, conference paper, review, book chapter and note. Most of the published documents are articles, which is 94.1%, followed by with review paper with 3% and conference papers with 2.4% of publications. The other types of documents, such as book chapters and notes show only 0.6% of publication.

Table 2: Types of Documents

Types of Documents	Total Publications	Percentage (%)
Article	478	94.1
Conference Paper	141	2.4
Review	15	3
Book Chapter	2	0.4
Note	1	0.2
Total	508	100

Table 3 presents the two types of sources in the publications of occupational stress of women. Between these two source types, the main source type is the journal with 99.60%, followed by book with only 0.4%. The table also displays that among the considered 508 publications, 506 were from journals.

Table 3: Types of Sources

Source Type	Total Publications	Percentage (%)
Journal	506	99.60
Book	2	0.4
Total	508	100

Subject Area

Present study also reviews the published paper on related topic based on the subject area. Based on Table 4, most of the study fields on occupational stress of female are in the field of Medicine with the percentage of 63.8% of total publication, followed by psychology with 8% and social science with 6.6% where in Business, Management and Accounting field the publication percentage is only 0.98%.

Table 4: Top Subject Area

Subject Area	Total Publications	Percentage (%)
Medicine	448	63.8
Psychology	56	8
Social Science	46	6.6
Environmental Science	31	4.4
Nursing	19	2.7
Biochemistry, Genetics and Molecular Biology	18	2.6
Arts and Humanities	15	2.1
Neuroscience	11	1.6
Health Professions	9	1.3
Pharmacology, Toxicology and Pharmaceutics	9	1.3
Business, Management and Accounting	5	0.98

Most Cited Papers

Table 5 displays the most cited publications over time. According to Guo et al. (2021), the top citation of paper determines the popularity of the article. The most cited article published by Kristensen *et al.* (2005) with 906 citation is the most cited article on the relevant context. The second most cited article is from Chandola *et al.* (2006) with 759 citations and the third most cited article by Kivimäki *et al.* (2006) with 637 citations focuses the issue of chronic work stress and consequences.

Table 5: Most Cited Papers

Authors	Cited by	Title
Kristensen <i>et al.</i> (2005)	906	The Copenhagen Psychosocial Questionnaire - A tool for the assessment and improvement of the psychosocial work environment
Chandola <i>et al.</i> (2006)	759	Chronic stress at work and the metabolic syndrome: Prospective study
Kivimäki <i>et al.</i> (2006)	637	Work stress in the etiology of coronary heart disease - A meta-analysis
Kivimäki <i>et al.</i> (2002)	634	Work stress and risk of cardiovascular mortality: Prospective cohort study of industrial employees
Theorell <i>et al.</i> (2015)	503	A systematic review including meta-analysis of work environment and depressive symptoms
De Jonge <i>et al.</i> (2000)	459	Job strain, effort-reward imbalance and employee well-being: A large- scale cross-sectional study
Ng and Jeffery (2003)	450	Relationships between Perceived Stress and Health Behaviours in a Sample of Working Adults
Hansen <i>et al.</i> (2006)	310	Bullying at work, health outcomes, and physiological stress response

Bernard <i>et al.</i> (1994)	303	Job task and psychosocial risk factors for work-related musculoskeletal disorders among newspaper employees
Hellerstedt and Jeffery (1997)	245	The association of job strain and health behaviours in men and women
Kawakami <i>et al.</i> (1995)	207	Assessment of job stress dimensions based on the job demands-control model of employees of telecommunication and electric power companies in Japan: reliability and validity of the Japanese version of the job content questionnaire
Richman <i>et al.</i> (1999)	203	Sexual harassment and generalized workplace abuse among university employees: Prevalence and mental health correlates
Kouvonen <i>et al.</i> (2005)	200	Work stress, smoking status, and smoking intensity: An observational study of 46 190 employees
Godin <i>et al.</i> (2005)	195	A prospective study of cumulative job stress in relation to mental health
Shinn <i>et al.</i> (1984)	190	Coping with job stress and burnout in the human services
Fransson <i>et al.</i> (2012)	174	Job strain as a risk factor for leisure-time physical inactivity: An individual-participant meta-analysis of up to 170,000 men and women
Stansfeld <i>et al.</i> (2002)	171	Psychological distress as a risk factor for coronary heart disease in the Whitehall II Study

Plaisier <i>et al.</i> (2007)	160	The contribution of working conditions and social support to the onset of depressive and anxiety disorders among male and female employees
Kivimäki <i>et al.</i> (2007)	154	Effort-reward imbalance, procedural injustice and relational injustice as psychosocial predictors of health: Complementary or redundant models?
Virtanen <i>et al.</i> (2002)	152	Employment security and health

Publications by Country

Table 6 presents the 25 most productive countries with highest contribution to the publications of occupational stress of women with at least ten published articles. Researchers from 63 different countries (excluded 6 undefined countries) contributed most to the publication on the related area. Finland was ranked first with a total of 91 publications. Other top ten countries in publishing more research articles on the field of occupational stress of women are the USA, Sweden, UK, Germany, Japan, France, Canada, Italy and Netherlands.

Table 6: Most Productive Countries

Country	Total Publication	Percentage %
Finland	91	18%
United States	63	12%
Sweden	61	12%
United Kingdom	49	10%
Germany	47	9%
Japan	44	9%
France	39	8%
Canada	27	5%
Italy	26	5%
Netherlands	26	5%
Denmark	22	4%

Australia	14	3%
Poland	14	3%
Norway	11	2%
Switzerland	11	2%
Taiwan	11	2%
South Korea	10	2%
Belgium	8	2%
Iran	7	1%
Ireland	7	1%
Brazil	6	1%
China	6	1%
India	6	1%
Spain	6	1%
Greece	5	1%

Most Active Authors

In Table 7, the most active authors with at least 10 publications on related field are revealed. Data was presented with their total publication numbers, the number of cited papers, total citation, h index and its publication year start. According to the data presented in Table 6, Kivimäki, Mika is appeared as a leading author in publishing relating to occupational stress with a total publication number of articles is 40. This is followed by Vahtera, J. with 32 articles and Virtanen, M. with 23 published articles.

Table 7: Most Active Authors

Author name	NTP	%	NCP	TC	h	PYS
Kivimäki, M.	40	8%	40	3850	29	2001
Vahtera, J.	32	6%	31	3571	26	2001
Virtanen, M.	23	5%	22	2015	15	2004
Lahelma, E.	20	4%	20	1006	17	2003
Pentti, J.	20	4%	19	1497	15	2001
Niedhammer, I.	18	4%	18	624	10	2006
Rahkonen, O.	17	3%	17	744	13	2007
Chastang, J.F.	15	3%	15	112	1	2013
Lallukka, T.	15	3%	15	588	11	2005

Elovainio, M.	14	3%	14	1465	13	2003
Leino-Arjas, P.	14	3%	14	1165	10	1998
Rugulies, R.	11	2%	11	496	8	2006
Kouvonen, A.	10	2%	10	1324	9	2005
Siegrist, J.	10	2%	10	1203	9	2000
Theorell, T.	10	2%	10	1040	9	2005

NTP = Total number of publications, NCP = Number of cited publications, TC = Total citations, $h = h$ -index

Most Active Source Title

The source-wise publication analysis was conducted from the collected data and is presented in Table 8. Table 8 shows the most active source title based on a minimum number of 10 publications. Evidence from the collected data indicates that the International Archives of Occupational and Environmental Health by Springer Nature has the highest number of publications, with a total of 32. This is followed by Scandinavian Journal of Work Environment and Health published by Finnish Institute of Occupational Health with 23 published papers and Journal of Occupational and Environmental Medicine published by Wolters Kluwer Health with 22 publications.

Table 8: Most Active Source Title

Source Title	NTP	%	NCP	TC	h	PYS
International Archives of Occupational and Environmental Health	32	6%	31	840	15	1987
Scandinavian Journal of Work Environment and Health	23	5%	22	2266	14	1990
Journal Of Occupational and Environmental Medicine	22	4%	21	563	11	2000
International Journal of Environmental Research and Public Health	17	3%	17	209	8	2015
Occupational and Environmental Medicine	17	3%	17	1007	6	1998
Occupational Medicine	17	3%	17	359	10	1979
BMC Public Health	15	3%	15	1016	10	2004

Journal of Epidemiology and Community Health	13	3%	13	1141	12	1989
Social Science and Medicine	12	2%	12	1217	11	1991

NTP = Total number of publications, NCP = Number of cited publications, TC = Total citations, *h* = *h*-index, PYS = Publication year start

Most Productive Institutions

Table 9 demonstrates the most productive institutions and the total number of published articles by each of these institutions. To ensure the simplicity of data presentation, the top fifteen affiliations are included in the table. Based on Table 9, Helsingin Yliopisto, with a total of 63 publications, is considered as the most productive institution in publishing issues related to occupational stress of women followed by Työterveyslaitos with 60 publications and Karolinska Institutet with 28 publications on related topic.

Table 9: Most Productive Institutions

Institution	Total Publications	%
Helsingin Yliopisto	63	12%
Työterveyslaitos	60	12%
Karolinska Institutet	28	6%
Inserm	25	5%
University College London	24	5%
Stockholms Universitet	20	4%
Turun yliopisto	18	4%
National Institute for Health and Welfare	18	4%
Det Nationale Forsknings center for Arbejdsmiljø	17	3%
Stress Forsknings Institutet	17	3%
Uppsala Universitet	15	3%
Turun Yliopistollinen Keskussairaala	15	3%
Heinrich-Heine-Universität Düsseldorf	14	3%
Københavns Universitet	12	2%
Kitasato University School of Medicine	11	2%

Network Analysis

Network analysis is one of the popular parts in bibliometric analysis. According to Mishra *et al.* (2017) tools like Pajek, VOSviewer, Gephi and HistCite are the some of the most prevalent tools for doing network exploration. Baker *et al.* (2020) opined that VOSviewer is suitable in mapping analysis because it applies standardised weights such as the number of occurrences and the total link strength to signify the relevance and strength of a relation in a network involving the authors, keywords, citations or countries (Baker *et al.*, 2020; Van Eck & Waltman, 2018).

Collaboration Analysis

Figure 3 explains the key collaboration between countries on occupational stress research. It is clearly shown in Figure 3 that the research collaboration is being fostered by the scholars from United Kingdom followed by the researchers from Finland and Germany. These three leading countries have strong collaboration among all other countries and the researchers from these countries have collaboration with researchers from Sweden, Denmark, Netherlands, United States and Canada. Japan and China are recognized as the main Asian countries to make research collaborations with the key western collaborators.

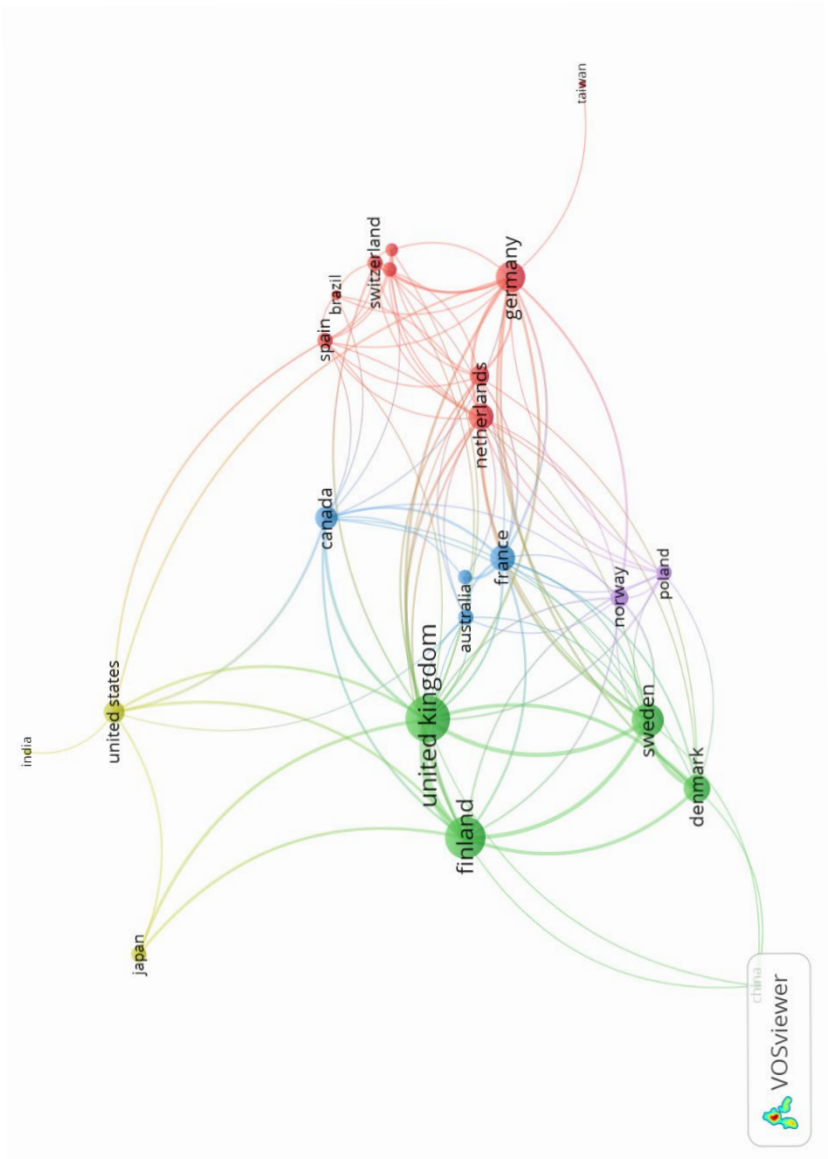


Figure 3: Collaboration Network

Co-occurrence Network

A co-occurrence network denotes the rate of occurrence on the proximity of similar keywords across numerous documents (Rahman *et al.*, 2022). Co-occurrence may also include the keywords that are linked with each other based on the similar topic. Figure 4 below shows the co-occurrence network of author keywords. The figure displays that the stronger relationship between the keywords with thicker line. Keywords that share no connecting lines indicate no established relationship among them. In this regard, present study presents that occupational stress, work stress, burnout, bullying are some of the keywords linked together. If a keyword's bubble is large, it is assumed to be utilised more. So, these keywords have a close relation with each other and often they co-occur together.

Table 10: Top Author Keywords

Keyword	Occurrences
Stress	47
Gender	29
Depression	19
Mental Health	w27
Occupational Health	22
Working conditions	19
Job Strain	21
Work Stress	21
Occupational Stress	29
Burnout	19
Health	12
Psychosocial Work Factors	14
Sickness Absence	15
Job Stress	18
Epidemiology	14
Psychological Distress	14
Women	13
Effort -Reward Imbalance	13
Workplace	10

DISCUSSIONS AND CONCLUSIONS

A thoughtful understanding regarding the literature on the global trends occupational stress of female can be achieved through the bibliometric analysis. This research topic has had its ups and downs from the beginning. Research on occupational stress had its peak on 2019 with the maximum number of publications indexed in Scopus database. Although in last two years the issue has experienced a decrease in terms of publications, it may increase in near future as the research trends showed an increase after a few years of decreased publications on this topic. Also, future studies can also be conducted to identify the reason behind decreased rate on publications on occupational stress particularly on female employees. In this regard, previous author also supported the application of Conservation of Resources

(COR) theory to provide a greater understanding on the development of theoretical framework on occupational stress. Therefore, present study believes that the Conservation of Resources (COR) theory is suitable to be implemented to address the issue.

Present study has recognised key players in research collaboration on similar issue. The geographic dispersion of the literature illustrates that the Finland has the highest number of publications compared to other representing countries such as the USA, Germany, UK, Sweden and so on. Among the most productive countries, only Japan is making its mark on occupational stress research from Asian countries. Hence, current study considers the urge of more research on the related field from other Asian countries. This study also proposes that future research on occupational stress of women should be conducted in other developing countries as female participation is increasing in developing countries as well for instance, Bangladesh. However, future research can also be conducted to evaluate the occupational stress of female on post COVID period.

Another interesting fact revealed by the present study is that majority of the research on occupational stress are conducted on the medical science area (63.8%). Other areas to make following contributions are psychology (8%) and social science (6.6%). Researchers from business and management area are yet to work on this topic as publications from business, management and accounting area are even less than 1%. So, future researchers with business and management concentration can consider working on occupational stress since in VOSviewer map it is evident occupational stress is linked with workplace bullying, working conditions, work-family conflict, job satisfaction and so on. Based on the findings on authors keywords, it is found that a growing number of author keywords in the occupational stress literature are burnout, psychological stress, bullying, job satisfaction, gender, depression, working conditions, mental health. Thus, these areas have potential research gap to work on in future.

As highlighted above, results from the present study are useful to the academicians, research scholars and to the policy makers who are involved in handling occupational stress. Several perspectives can be considerable for both the researchers and industry practitioners while dealing with occupational stress. For example, it is possible to assume that lack of work-

family balance may lead to work stress and lead to unproductive work. Hence, the scholars can consider working on the psychological factors that work behind the occupational stress and the organisations can initiate on improving the conditions to overcome employees' occupational stress. Moreover, organisations can work collaboratively with the government to cautiously plan and progress the current policies of the occupational stress management of organisational members. As presented in the network analysis, there are many areas for the researchers and policymakers to work on such as improving working conditions, reducing workplace bullying, balancing work-family conflict, improved mental health and enhancing occupational health.

Like any other study, this study has some inherent limitations also. The study only relies on Scopus as a database. Although Scopus is considered as one of the largest and reliable databases, but still there are unindexed journals and such journals can be ignored. Also, choosing Scopus as the only database may limit the search for the study. Future scholars are highly encouraged to utilise other database sources, such as Google Scholar, Science Direct etc. while assessing the research trends for the relevant studies.

Although the search strategy for the study considered title, keywords and abstracts, the researchers could not guarantee that search query is 100% perfect. Since false positive and false negative results may happen, it is not possible to ensure that all the published articles in the related issue have been covered. So, the total number of publications and citations are believed to be correct only at the time of the search. Besides, present study only focuses on the topic related to occupational stress of women. No specific industry was considered for this study. Hence, future study can be conducted on industry-specific occupational stress of women/men or both. Also, it is recommended for future studies to explore this topic specifically focusing on recovery strategy of occupational stress. All quantitative, qualitative and experimental research on the management of occupational stress may provide noteworthy discoveries to this area.

REFERENCES

- Armstrong, G. S., Atkin-Plunk, C. A., & Wells, J. (2015). The relationship between work–family conflict, correctional officer job stress, and job satisfaction. *Criminal Justice and Behavior*, *42*(10), 1066-1082. <https://doi.org/10.1177/0093854815582221>
- Azad, T. (2014). Managing stress among banking sector employees in Bhopal. *IRC'S International Journal of Multidisciplinary Research in Social & Management Science*, *2*, 44-48.
- Babore, A., Lombardi, L., Viceconti, M. L., Pignataro, S., Marino, V., Crudele, M., Candelori, C., Bramanti, S. M., & Trumello, C. (2020). Psychological effects of the COVID-2019 pandemic: Perceived stress and coping strategies among healthcare professionals. *Psychiatry Research*, *293*, 113366. <https://doi.org/10.1016/j.psychres.2020.113366>
- Baker, H. K., Kumar, S., & Pattnaik, D. (2020). Fifty years of The Financial Review: A bibliometric overview. *Financial Review*, *55*(1), 7-24. <https://doi.org/10.1111/fire.12228>
- Bernard, B., Sauter, S., Fine, L., Petersen, M., & Hales, T. (1994). Job task and psychosocial risk factors for work-related musculoskeletal disorders among newspaper employees. *Scandinavian Journal of Work, Environment & Health*, *20*(6), 417-426. <https://doi.org/10.5271/sjweh.1379>.
- Boyce, C. J., Wood, A. M., Banks, J., Clark, A. E., & Brown, G. D. (2013). Money, well-being, and loss aversion: Does an income loss have a greater effect on well-being than an equivalent income gain? *Psychological Science*, *24*(12), 2557-2562. <https://doi.org/10.1177/0956797613496436>
- Chandola, T., Brunner, E., & Marmot, M. (2006). Chronic stress at work and the metabolic syndrome: Prospective study. *BMJ*, *332*(7540), 521-525. <https://doi.org/10.1136/bmj.38693.435301.80>
- Charles, M. (2003). Deciphering sex segregation: Vertical and horizontal inequalities in ten national labor markets. *Acta Sociologica*, *46*(4), 267-287. <https://doi.org/10.1177/0001699303464001>

- Cheung, F. M., & Halpern, D. F. (2010). Women at the top: Powerful leaders define success as work+ family in a culture of gender. *American Psychologist*, 65(3), 182. [https:// doi/10.1037/a0017309](https://doi/10.1037/a0017309)
- Cho, Y., You, J., Kim, S., Han, H., Kim, M., & Yoon, S. (2018). Assimilation and resistance: the token status of women leaders in South Korea. *Academy of Management Proceedings*, 2018(1), 13609. <https://doi.org/10.5465/AMBPP.2018.12>
- Daniel, J. L. (2015). Workplace spirituality and stress: Evidence from Mexico and US. *Management Research Review*, 38(1), 29-43. <https://doi.org/10.1108/MRR-07-2013-0169>
- De Jonge, J., Bosma, H., Peter, R., & Siegrist, J. (2000). Job strain, effort-reward imbalance and employee well-being: A large-scale cross-sectional study. *Social Science & Medicine*, 50(9), 1317-1327. [https://doi.org/10.1016/S0277-9536\(99\)00388-3](https://doi.org/10.1016/S0277-9536(99)00388-3)
- Fahimnia, B., Tang, C.S., Davarzani, H. and Sarkis, J. (2015). Quantitative models for managing supply chain risks: a review. *European Journal of Operational Research*, 247(1), 1-15. <https://doi.org/10.1016/j.ejor.2015.04.034>
- Falconier, M. K., Nussbeck, F., Bodenmann, G., Schneider, H., & Bradbury, T. (2015). Stress from daily hassles in couples: Its effects on intradyadic stress, relationship satisfaction, and physical and psychological well-being. *Journal of Marital and Family Therapy*, 41(2), 221-235. <https://doi.org/10.1111/jmft.12073>
- Fransson, E. I., Heikkilä, K., Nyberg, S. T., Zins, M., Westerlund, H., Westerholm, P., Väänänen, A., Virtanen, M., Vahtera, J., & Theorell, T. (2012). Job strain as a risk factor for leisure-time physical inactivity: an individual-participant meta-analysis of up to 170,000 men and women: the IPD-Work Consortium. *American Journal of Epidemiology*, 176(12), 1078-1089. <https://doi.org/10.1093/aje/kws336>
- IGI Global (2018). Bibliometric analysis. <https://www.igi-global.com/dictionary/education-literature-development-responsibility/2406>.

- Godin, I., Kittel, F., Coppieters, Y., & Siegrist, J. (2005). A prospective study of cumulative job stress in relation to mental health. *BMC Public Health*, 5(1), 1-10. <https://doi.org/10.1186/1471-2458-5-67>
- Guo, Y. M., Huang, Z. L., Guo, J., Guo, X. R., Li, H., Liu, M. Y., & Nkeli, M. J. (2021). A bibliometric analysis and visualization of blockchain. *Future Generation Computer Systems*, 116, 316-332. <https://doi.org/10.1016/j.future.2020.10.023>
- Halbesleben, J. R., Neveu, J.-P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the “COR” understanding the role of resources in conservation of resources theory. *Journal of Management*, 40(5), 1334-1364. <https://doi.org/10.1177/0149206314527130>
- Hansen, Å. M., Høgh, A., Persson, R., Karlson, B., Garde, A. H., & Ørbaek, P. (2006). Bullying at work, health outcomes, and physiological stress response. *Journal of Psychosomatic Research*, 60(1), 63-72. <https://doi.org/10.1016/j.jpsychores.2005.06.078>
- Hassan, N. M., Abu-Elenin, M. M., Elsallamy, R. M., & Kabbash, I. A. (2020). Job stress among resident physicians in Tanta University Hospitals, Egypt. *Environmental Science and Pollution Research*, 27(30), 37557-37564. <https://doi.org/10.1007/s11356-020-08271-9>
- Hassan, S., & Ahmi, A. (2022). Mapping the state of the art of scientific production on requirements engineering research: A bibliometric analysis. *International Journal of Information Technologies and Systems Approach (IJITSA)*, 15(1), 1-23.
- Hellerstedt, W. L., & Jeffery, R. W. (1997). The association of job strain and health behaviours in men and women. *International Journal of Epidemiology*, 26(3), 575-583. <https://doi.org/10.1093/ije/26.3.575>
- Henning, G. (1973). Women's work from the point of view of the company physician. *Zentralbl Bakteriol Orig B.*, 158(3-4), 239-245. from www.scopus.com

- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*(3), 513. <https://psycnet.apa.org/doi/10.1037/0003-066X.44.3.513>
- Iftikhar, P. M., Ali, F., Faisaluddin, M., Khayat, A., De Sa, M. D. G., & Rao, T. (2019). A bibliometric analysis of the top 30 most-cited articles in gestational diabetes mellitus literature (1946-2019). *Cureus*, *11*(2). <https://doi.org/10.7759/cureus.4131>
- Jayakumar, S., Varma, P., & Bangalore, B. (2020). Work stress among full-time external employee assistance professionals: Theory Development. *International Journal of Engineering Applied Sciences and Technology*, *4*(9), 416-420.
- Kanter, R.M. (1977). Some effects of proportions on group life. In Rieker, P.P., Carmen, E. (eds) *The Gender Gap in Psychotherapy*. Springer, Boston, MA. https://doi.org/10.1007/978-1-4684-4754-5_5
- Kawakami, N., Kobayashi, F., Araki, S., Haratani, T., & Furui, H. (1995). Assessment of job stress dimensions based on the job demands-control model of employees of telecommunication and electric power companies in Japan: Reliability and validity of the Japanese version of the job content questionnaire. *International Journal of Behavioral Medicine*, *2*(4), 358-375. https://doi.org/10.1207/s15327558ijbm0204_5
- Kivimäki, M., Leino-Arjas, P., Luukkonen, R., Riihimäi, H., Vahtera, J., & Kirjonen, J. (2002). Work stress and risk of cardiovascular mortality: prospective cohort study of industrial employees. *BMJ*, *325*(7369), 857. <https://doi.org/10.1136/bmj.325.7369.857>
- Kivimäki, M., Vahtera, J., Elovainio, M., Virtanen, M., & Siegrist, J. (2007). Effort-reward imbalance, procedural injustice and relational injustice as psychosocial predictors of health: Complementary or redundant models? *Occupational and Environmental Medicine*, *64*(10), 659-665. <http://dx.doi.org/10.1136/oem.2006.031310>

- Kivimäki, M., Virtanen, M., Elovainio, M., Kouvonen, A., Väänänen, A., & Vahtera, J. (2006). Work stress in the etiology of coronary heart disease—A meta-analysis. *Scandinavian Journal of Work, Environment & Health*, 32(6), 431-442. <https://www.jstor.org/stable/40967596>
- Kouvonen, A., Kivimäki, M., Virtanen, M., Pentti, J., & Vahtera, J. (2005). Work stress, smoking status, and smoking intensity: An observational study of 46 190 employees. *Journal of Epidemiology & Community Health*, 59(1), 63-69. <http://doi.org/10.1136/jech.2004.019752>
- Kristensen, T. S., Hannerz, H., Høgh, A., & Borg, V. (2005). The Copenhagen Psychosocial Questionnaire-A tool for the assessment and improvement of the psychosocial work environment. *Scandinavian Journal of Work, Environment & Health*, 31(6), 438-449. <https://www.jstor.org/stable/40967527>
- Kumari, V. (2014). Problems and challenges faced by urban working women in India. Master dissertation. National Institute Of Technology, Rourkela
- Kwok, S. Y., Cheng, L., & Wong, D. F. (2015). Family emotional support, positive psychological capital and job satisfaction among Chinese white-collar workers. *Journal of Happiness Studies*, 16(3), 561-582. <https://doi.org/10.1007/s10902-014-9522-7>
- Mahipalan, M., & Sheena, S. (2019). Workplace spirituality, psychological well-being and mediating role of subjective stress: A case of secondary school teachers in India. *International Journal of Ethics and Systems*, 35(4), 725-739. <https://doi.org/10.1108/IJOES-10-2018-0144>
- Mishra, D., Gunasekaran, A., Papadopoulos, T., & Hazen, B. (2017). Green supply chain performance measures: A review and bibliometric analysis. *Sustainable Production and Consumption*, 10, 85-99. <https://doi.org/10.1016/j.spc.2017.01.003>
- Ng, D. M., & Jeffery, R. W. (2003). Relationships between perceived stress and health behaviors in a sample of working adults. *Health Psychology*, 22(6), 638. <https://doi.org/10.1037/0278-6133.22.6.638>

- Plaisier, I., de Bruijn, J. G., de Graaf, R., ten Have, M., Beekman, A. T., & Penninx, B. W. (2007). The contribution of working conditions and social support to the onset of depressive and anxiety disorders among male and female employees. *Social Science & Medicine*, 64(2), 401-410. <https://doi.org/10.1016/j.socscimed.2006.09.008>
- Rahman, N. A. A., Ahmi, A., Jraisat, L., & Upadhyay, A. (2022). Examining the trend of humanitarian supply chain studies: Pre, during and post COVID-19 pandemic. *Journal of Humanitarian Logistics and Supply Chain Management*, 12(4). <https://doi.org/10.1108/JHLSCM-01-2022-0012>
- Richman, J. A., Rospenda, K. M., Nawyn, S. J., Flaherty, J. A., Fendrich, M., Drum, M. L., & Johnson, T. P. (1999). Sexual harassment and generalized workplace abuse among university employees: Prevalence and mental health correlates. *American Journal of Public Health*, 89(3), 358-363. <https://doi.org/10.2105/AJPH.89.3.358>
- Rodrigues, M., & Franco, M. (2022). Bibliometric review about eco-cities and urban sustainable development: Trend topics. *Environment, Development and Sustainability*, 24, 13683–13704. <https://doi.org/10.1007/s10668-021-02006-7>
- Saxena, A., Garg, N., Punia, B., & Prasad, A. (2020). Exploring role of Indian workplace spirituality in stress management: A study of oil and gas industry. *Journal of Organizational Change Management*, 33(5), 779-803. <https://doi.org/10.1108/JOCM-11-2019-0327>
- Shinn, M., Rosario, M., Mørch, H., & Chestnut, D. E. (1984). Coping with job stress and burnout in the human services. *Journal of Personality and Social Psychology*, 46(4), 864. <https://psycnet.apa.org/doi/10.1037/0022-3514.46.4.864>
- Shortland, S., & Altman, Y. (2011). What do we really know about corporate career women expatriates? *European Journal of International Management*, 5(3), 209-234. <https://doi.org/10.1504/EJIM.2011.039939>

- Stansfeld, S. A., Fuhrer, R., Shipley, M. J., & Marmot, M. G. (2002). Psychological distress as a risk factor for coronary heart disease in the Whitehall II Study. *International Journal of Epidemiology*, 31(1), 248-255. <https://doi.org/10.1093/ije/31.1.248>
- Sweileh, W. M., Al-Jabi, S. W., AbuTaha, A. S., Zyoud, S. E. H., Anayah, F. M., & Sawalha, A. F. (2017). Bibliometric analysis of worldwide scientific literature in mobile-health: 2006–2016. *BMC Medical Informatics and Decision Making*, 17, 1-12. <https://doi.org/10.1186/s12911-017-0476-7>
- Theorell, T., Hammarström, A., Aronsson, G., Träskman Bendz, L., Grape, T., Hogstedt, C., Marteinsdottir, I., Skoog, I., & Hall, C. (2015). A systematic review including meta-analysis of work environment and depressive symptoms. *BMC Public Health*, 15(1), 1-14. <https://doi.org/10.1186/s12889-015-1954-4>
- Thunman, E. (2015). Managing stress: A matter of proactivity or trust? A thematic study of female-and male-dominated Swedish work settings. *Qualitative Research in Organizations and Management: An International Journal*, 10(2), 134-152. <https://doi.org/10.1108/QROM-11-2013-1184>
- Tran, B. & Tran, B. (2016), “Communication (intercultural and multicultural) at play for cross cultural management within multinational corporations (MNCs). In Zakaria, N., Abdul-Talib, A. and Osman, N. (Eds), *Handbook of Research on Impacts of International Business and Political Affairs on the Global Economy*. IGI Global. <https://doi.org/10.4018/978-1-4666-9806-2.ch004>
- Tzeng, R. (2006). Gender issues and family concerns for women with international careers: Female expatriates in Western multinational corporations in Taiwan. *Women in Management Review*, 21(5), 376-392. <https://doi.org/10.1108/09649420610676190>
- Uddin, M. (2020). The role of family social support on work stress for frontline working mothers in Bangladesh. *Studies in Business and Economics*, 23(1), 38-60. <https://doi.org/10.29117/sbe.2020.0120>

- Uddin, M., Ali, K. B., & Khan, M. A. (2020). Perceived social support (PSS) and work-life balance (WLB) in a developing country: The moderating impact of work-life policy. *Iranian Journal of Management Studies*, 13 (4), 733-761. <https://doi.org/10.22059/ijms.2020.282543.673663>
- Upadhyay, A., & Singh, A. P. (2017). Role of Occupational Stress and Social Support in Negative Mental Health among Women Employees in Banking Sectors. *Journal of the Indian Academy of Applied Psychology*, 43(2), 222-229.
- Van Eck, N., & Waltman, L. (2018). VOSviewer Manual 1.6. 11. Manual,(Version 1.6. 9). Leiden University
- Virtanen, P., Vahtera, J., Kivimäki, M., Pentti, J., & Ferrie, J. (2002). Employment security and health. *Journal of Epidemiology & Community Health*, 56(8), 569-574. <http://dx.doi.org/10.1136/jech.56.8.569>
- Westman, M., Hobfoll, S. E., Chen, S., Davidson, O. B., & Laski, S. (2004). Organizational stress through the lens of conservation of resources (COR) theory. In Perrewe, P. L. & Ganster, D. C. (Ed.). *Exploring Interpersonal Dynamics*. Emerald Group Publishing Limited, Bingley. [https://doi.org/10.1016/S1479-3555\(04\)04005-3](https://doi.org/10.1016/S1479-3555(04)04005-3)
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational Behavior*, 74(3), 235-244. <https://doi.org/10.1016/j.jvb.2008.11.003>