Psychological Well-being of Software Developers in a Multinational IT Corporation in India: Protocol for a Cross-sectional Study

Yesoda Bhargava

Contents

Abstract

Psychological well-being of employees in the Information Technology (IT) sector has been linked to work productivity, quality of life and general well-being. The adverse effects of poor psychological well-being at workplace (PWBW) on cardiovascular health, musculoskeletal function and oral health are well-documented. However, research in this field in India is limited and inadequate. As the IT industry expands in the country it is timely to systematically identify and examine factors which impact employees' psychological well-being (PWB) negatively. To this end, the current study intends to explore the PWB of software developers employed at Amazon, India. A cross-sectional study is proposed that measures the PWBW using a 17-item based index apriori validated for use in the Indian context. The index assesses PWB across five spectrums and provides a cumulative score and spectrum-wise scores. Scores are analysed to inform overall PWB of employees and identify low-score areas. The results of the study could be useful for informing organizational level policies in the Indian IT industries and sensitizing the government towards occupational stress in the IT industry.

1 Introduction

Information Technology (IT) is a rapidly growing sector in India (Acharya and Pentapati, 2012; Kunikullaya et al., 2010; Mehta and Parijat, 2012; Padma et al., 2015; Rathore and Ahuja, 2015; Erumban and Das, 2016). Indian IT sector caters to the demands of around 1000 centers across 80 countries making India as the most desirable global IT offshoring location (Erumban and Das, 2016; IBEF, 2019). Both domestic and foreign IT corporations have successfully established their operational offices in India and more than 4700 start-ups currently operate (DPIIT, 2018). Accelerated expansion of IT companies, indicative of higher demand for technology-based products and services, has led to greater expectation of efficiency, faster delivery and increased work pressure (Rathore and Ahuja, 2015; Babu et al., 2015). The complex work environment of speed, efficiency, deadlines and targets in the industry has increasingly brought the psychosocial health of the employees under concern (Rathore and Ahuja, 2015; Aryan and Kathuria, 2017; Subikshaa and Jasmin, 2018). Research in the domain of psychological well-being (PWB) of employees in the IT sector is relatively nascent but is quickly gathering attention due to its rapid growth (Kunikullaya et al., 2010; Erumban and Das, 2016) and the evidence surrounding the degrading psychological well-being of employees in these industries (Rathore and Ahuja, 2015; Babu et al., 2015). Factors like long working hours, sedentary life style, tight deadlines, night shift, launch-time stress and persistent expectation to be abreast with new technology (Agrawal and Thite, 2003; Aryan and Kathuria, 2017) have been implicated for the rising psychological pressure on software developers – primary employees in the IT sector. In fact, Kunikullaya et al. (2010) state that erratic daily routines due to occupational stress in these industries have led to poor eating habits like skipping meals, overeating, excessive drinking of coffee and beverages. Moreover, a higher prevalence of smoking has also been observed among the employees in the IT sector (ibid.). Qualitative evidence suggests that burnout, stress, social isolation and other health hazards are increasingly becoming important employment issues affecting the industry (Agrawal and Thite, 2003; Tiwari et al., 2008). According to Guardian, IT industry is the most vulnerable to lifestyle diseases and future growth could be stunted if the problem is not addressed (Mahapatra, 2019). Clearly, there is a strong evidence that affirms

the need to explore the PWB of IT sector employees in India.

The current study attempts to estimate the PWB of employees presently working at Amazon, India, a foreign multinational technology-based company, using a cross-sectional survey design. The primary outcome, psychological well-being at workplace (PWBW), is measured using a 17-item based index apriori validated to be used in the Indian context (Sandilya and Shahnawaz, 2018). The index is referred to as the Index of Psychological Well-Being at Workplace (IPWBW). IPWBW uses five unique work-related dimensions to inform the overall PWBW (Fig. 1). Each question is answered on a scale from 0 (disagree) to 5 (completely agree). The individual scores are added to provide average cumulative score and dimensional scores. To facilitate the analysis of PWBW, information on demographic factors and work-related aspects is also collected.

2 Literature Review

Indian IT industry has contributed significantly to nation's economic growth, mainly through its most dominant sector - the software service industry (Erumban and Das, 2016). Notwithstanding the economic benefits, there is significant evidence related to the workplace psychological stress faced by software employees and its impact on their physical health and psychological well-being.

In 2012, a survey of 77 IT professionals in India highlighted the relationship between job contentment, workload and perceived work-related musculoskeletal disorders (WMSDs) (Mehta and Parijat, 2012). The study found prevalence of shoulder, neck and low back pain in more than one-fourth of the respondents. The researchers used Job-Content Questionnaire to measure perception of psychosocial environment at workplace and subjective workload assessment technique (SWAT) to assess level of psychological stress. Explanation behind the application of JCQs and SWAT to the Indian population is not provided; their international applicability is cited as a viable explanation.

In the same year, another study explored the relationship between work stress among IT professionals in 2 mid-size companies (total 200-500 employees) and Oral health related Quality of Life (OHRQoL) in South India (Acharya and Pentapati, 2012). It reported peri-

odontal status and not work stress as a predictor of poor oral health. However, the study identified that poor oral health potentially compounds work stress by compromising the ability to handle work related responsibilities resulting in lower work-productivity. The small population size, however, does not inform much about the PWB of employees in larger size multinational corporations.

Expanding the experience of work-stress in IT sector was a detailed qualitative study involving 32 voluntary interviews with employees of IT/ITeS (IT enabled Services) conducted in 2015 which highlighted the relationship between contextual work-stressors and employee health (Babu et al., 2015). The study identified stress-inducing factors such as working on weekends, unrealistic expectations, monotonous work, lack of appreciation, travelling in traffic, pending-work anxiety, excessive supervision and also reported loss of social life and adoption of smoking as a consequence of high job demands. However, lack of distinction between individual experiences in IT and ITeS sector makes identification of industry-related job stress challenging. In the same year a different study showcased the impact of demographic factors on role stress among IT professionals in India and emphasized behavioral training among employees to develop coping skills (Rathore and Ahuja, 2015). The study emphasized a balanced approach to tackling stress at workplace including both organizational level policies and individual training.

In 2016, a cross-sectional study of software professionals in India identified a positive correlation between job stress and higher quality of life. The estimate provided by authors were adjusted on several demographic factors except age which could potentially explain the result (Babu et al., 2016, Table 4). In fact, an explanation of improved QoL in conjunction with stress is incomplete without considering the age (Aryan and Kathuria, 2017) and number of years spent in the industry (Babu et al., 2015). In 2017, a study was conducted to assess the workplace well-being and explore the job satisfaction levels of 150 IT employees in Chennai. It identified multiple factors that influence PWBW such as: relationship with co-workers, organizational support and procedures, medical benefits and perception of happy/sadness at work (Rajeswari and Magesh, 2017). The study highlighted that people above 42 years of age reported less stress at work. However, this group consisted of 14.7% of recruited people with majority (85%) under 41 years of age (42% in 18-29 years group). Autonomy at job

might explain lower level of occupational stress for this group (Wheatley, 2017).

The above discussed studies although insightful with regard to PWBW in the Indian IT sector, attached little to no importance to the Indian contextual and cultural factors in assessing PWBW. Sandilya and Shahnawaz (2018) addressed this gap in measuring PWBW. To this end they validated the Index of Psychological well-being at work (IPWBW) designed by Dagenais-Desmarais and Savoie (2012) for employees working in the automotive sector in India. The researchers found 17 items, spread over 5 dimensions, to be relevant for the Indian context (Fig. 1). While evidence related to the use of IPWBW for IT industry context is lacking, the applicability of 17-item IPWBW for Indian context makes it a valid index to be used in the Indian IT industry because national culture impacts the organizational culture (Mahbub, 2017).

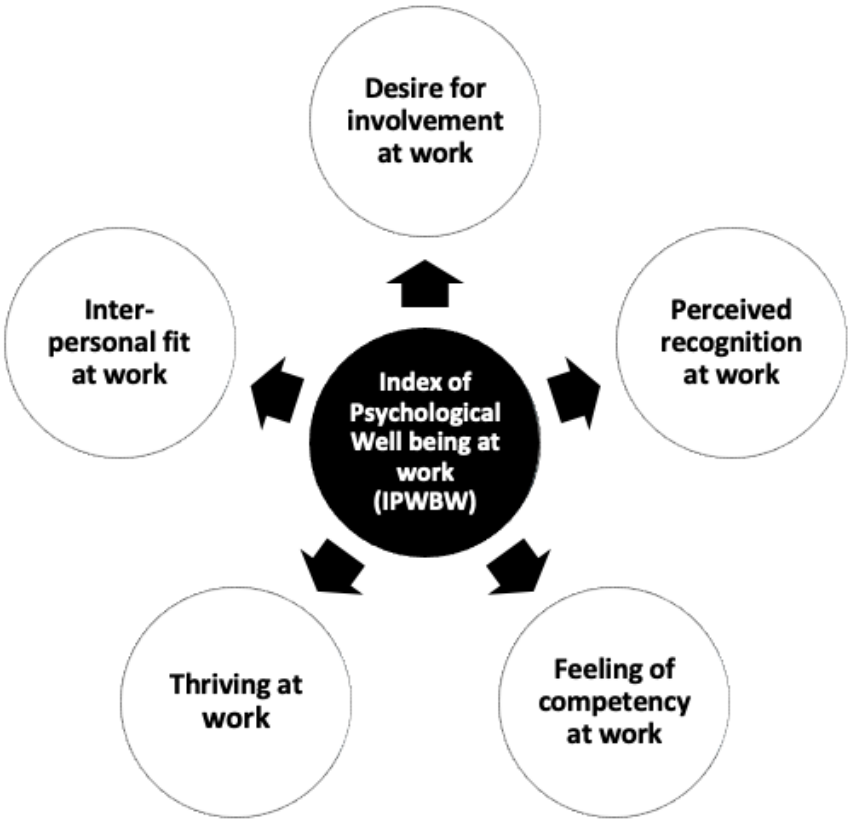

Figure 1: Five dimensions of Index of Psychological Well-being at Workplace.(Dagenais-Desmarais and Savoie, 2011)

3 Research Question

The study has following objectives:

1. **Primary Objective**: To estimate the psychological well-being of full-time software developers in the Indian IT industry.

2. **Secondary Objective**: Among full-time software developers, to compare the psychological well-being by gender.

4 Methodology

4.1 Study Design

A cross-sectional observational study is proposed to explore the current status of psychological wellbeing among software developers in a multinational IT company in India. Index of psychological well-being at work apriori validated for Indian context is used. To the researcher's knowledge no previous study of similar kind in the Indian IT sector has used a contextually and culturally validated index. A single organization is chosen because determinants of PWBW are organization specific (Sandilya and Shahnawaz, 2018). The association of gender is investigated in PWBW because of the inconclusive evidence on difference in PWBW by gender (Rathore and Ahuja, 2015) and the unique gender experiences and expectations at workplace (Bharathi et al., 2015).

4.2 Sample Selection

The study is proposed to be conducted in Amazon, Bangalore, India. It is chosen because it a large multinational technology-based company having 4 offices in the Bagmane Technological Park, employing a huge number of software developers. Amazon prides itself as a customer-oriented company. Therefore, it is critical to assess the psychosocial well-being of employees at Amazon who invest their time and energy in contributing to Amazon's growth in the e-commerce market.

4.3 Questionnaire administration

The survey is administered online through an email sent to all software developers at Amazon. Prior to it, a communication email is sent that describes the research study, its objectives, data handling agreement between partners, the clause of anonymity and confidentiality and the time window for the survey completion. In addition to the items on PWBW, questions related to: age, gender, position held, number of years in service, project type, average weekly hours spent in work are added in the questionnaire (refer Appendix). Each participating employee is identified by a Unique ID. All the variables are coded and a code dictionary describing their definition and value labels is created.

4.4 Ethical approval and mutual agreement

1. Prior permission is required from the management at Amazon to conduct the study. The HR department will be contacted and explained the objectives and potential benefits of the study.

2. Raw data access is limited to the research team. This is done to ensure the anonymity and confidentiality of employee participating in the study.

5 Data Analysis Plan

5.1 Outcome Measure

Table 1: Table showing the outcome measure used for the study.

Outcome	**Objective**
Subjective Psychological well-being at work.	Primary, Secondary

5.2 Data Analysis

All variables are explored individually and a detailed descriptive summary for each is generated. Potential outliers are noted and subsequently investigated after analyses to identify

whether they are influential or not. Broadly, following analyses are carried out:

1. For every employee, dimensional and cumulative scores are obtained by averaging the dimensional and cumulative scores by total answered items.
2. The average organization level IPWBW and dimensional scores are computed along with descriptive summary (95% confidence intervals).
3. Zero-order correlation matrix for five-dimensions of IPWBW is generated.
4. Relationship between IPWBW and gender is explored using two sample-t test and assumptions of normality and independence are checked.
5. Relationship between IPWBW and position held, number of years in service, project type and average weekly hours is explored using step-wise multiple linear regression method. Assumptions are checked after fitting the model.

5.3 Missing Data

1. If any missing value is found for the 17 items, imputation by dimensional mean is used.
2. If missing value in other variables is found, they are left as it is and list-wise elimination is used where applicable.

Significance level used is 5%. All statistical analyses and data visualization are performed in R version 3.3.3.

6 Practicalities and Contingency Plans

6.1 Non-disclosure of firm identify in research result dissemination

1. Establishing a relationship of trust with Amazon is vital for smooth progress of the study. In situation of major concerns from the company side, appropriate communication must be initiated and their concerns duly taken into account.

2. Culture within a company could influence its demands from the researchers and it is the duty of researchers to assure stakeholders of full support and address their concerns while ensuring that study objectives are not compromised. If a mutually agreeable decision could not be arrived at and the study is not possible, a different firm must be approached.

3. Firm's and the participating individual's identity must be kept confidential and not find any mention in the documentation. Details like name, date of birth etc. are not collected as part of the study to ensure anonymity to the respondents.

6.2 Research Report for IT Firm

A detailed report will be prepared specifically for the company stakeholders so that they may use it for informing organization-wide policy decisions related to employee psychosocial well-being.

6.3 Research Publication

Findings from the research will be presented in the occupational public health conferences in India and abroad.

6.4 Insufficient sample size

If the response rate of the study is not found suitable for parametric analysis, appropriate non-parametric counterparts will be used.

7 Resources required

1. A support staff from firm is required to communicate the messages related to research to employees through email. They will be provided appropriate training before the study begins.

2. A team of domain experts is needed to assess the external questions added to the questionnaire. They provide suggestions as to values for the additional variables and their definitions. The team will consist of two representatives, one each from industry and research group.

3. A pilot group (10 employees) from the firm is chosen for questionnaire assessment and their feedback is used to improve the questionnaire. Domain experts facilitate the process.

4. Funding for the project is given by Ministry of Electronics and Information Technology, Government of India.

8 Timeline

Fig. 2 shows the tentative timeline of the project.

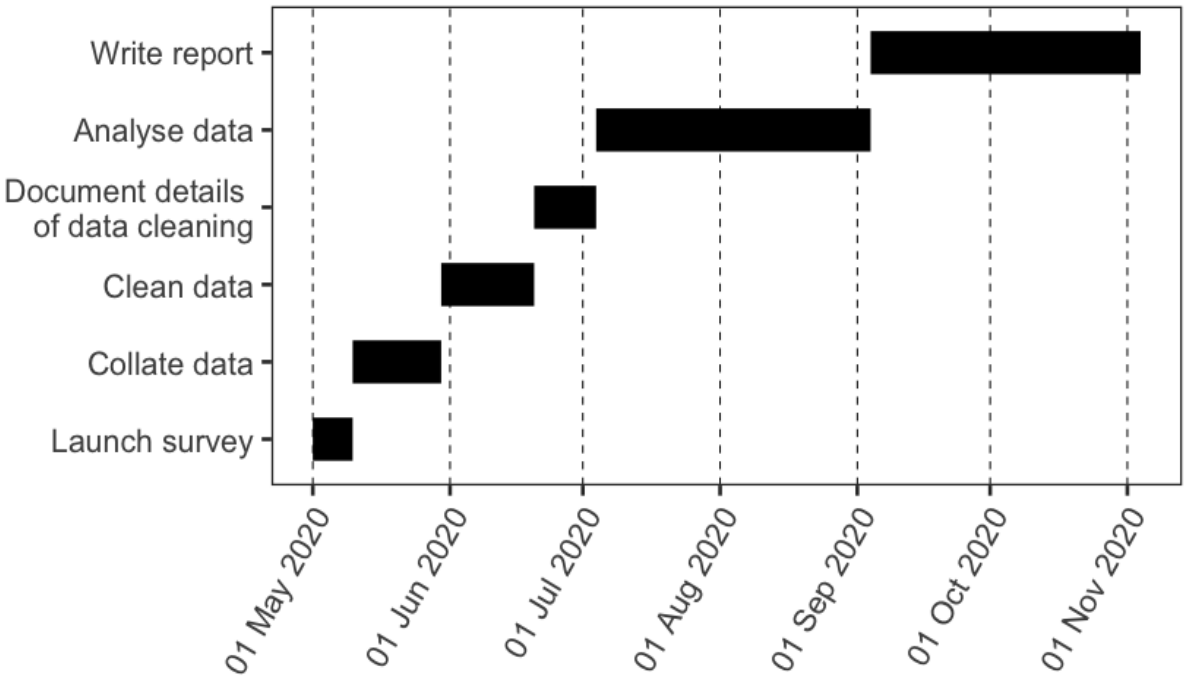

Figure 2: Tentative timeline of the project.

References

Acharya, S. and Pentapati, K. (2012), 'Work stress and oral health-related quality of life among indian information technology workers: an exploratory study', *International Dental Journal* **62**(3), 132–136.

Agrawal, N. and Thite, M. (2003), 'Human resource issues, challenges and strategies in the indian software industry', *International Journal of Human Resources Development and Management* **3**(3), 249–264.

Aryan, R. and Kathuria, D. (2017), 'Psychological well-being at workplace : An analytical study on IT sector', *International Journal of Advanced Research in Computer Science and Software Engineering* **7**(6).

Babu, G., Sudhir, P., Mahapatra, T., Das, A., Rathnaiah, M., Anand, I. and Detels, A. (2016), 'Association of quality of life and job stress in occupational workforce of india: Findings from a cross-sectional study on software professionals', *Indian Journal of Occupational and Environmental Medicine* **20**(2), 109–113.

Babu, G., Tn, S., Ketharam, S., Kar, S. and Detels, R. (2015), 'Perceived occupational stressors and the health software professionals in bengaluru, india', *The Qualitative Report* **20**(3), 314–335.

Bharathi, S., Mala, E. and Bhattacharya, S. (2015), 'Work life balance of women employees in the information technology industry', *Asian Journal of Management Research* **5**(3), 323–343.

Dagenais-Desmarais, V. and Savoie, A. (2012), 'What is psychological well-being really? a grassroots approach from the organizational sciences', *Journal of Happiness Studies* **13**, 659–684.

DPIIT (2018), 'Sector survey: IT and BPM sector'.

Erumban, A. and Das, D. (2016), 'Information and communication technology and economic growth in india', *Telecommunications Policy* **40**(5), 412–431.

IBEF (2019), 'It and ites industry in india'.
URL: *https://www.ibef.org/industry/information-technology-india.aspx*

Kunikullaya, K. U., Kirthi, S., Venkatesh, D. and Goturu, J. (2010), 'Heart rate variability changes in business process outsourcing employees working in shifts', *Indian Pacing and Electrophysiology Journal* **10**(10), 439–446.

Mahapatra, R. (2019), 'Lifestyle' diseases hit india's IT workers'.
URL: *https://www.theguardian.com/world/2007/sep/14/business.india*

Mahbub, A. (2017), 'The impact of national culture on the organizational culture: Multinational companies doing businesses in developing countries'.

Mehta, R. and Parijat, P. (2012), 'Associations between psychosocial risk factors and musculoskeletal disorders: application to the IT profession in india', *Work* **41**, 2438–2444.

Padma, V., Anand, N. N., Gurukul, S., Javid, S., Prasad, A. and Arun, S. (2015), 'Health problems and stress in information technology and business process outsourcing employees', *Journal of Pharmacy and Bioallied sciences* **7**, S9–S13.

Rajeswari, M. and Magesh, R. (2017), 'A study on psychological well-being among employees of IT company', *Asian Social Science* **3**(8), 59–65.

Rathore, S. and Ahuja, V. (2015), 'A study of role stress among the IT professionals in india: Examining the impact of demographic factors', *International Journal of Human Capital and Information Technology professionals* **6**(2), 1–13.

Sandilya, G. and Shahnawaz, G. (2018), 'Index of psychological well-being at work – validation of tool in the indian organizational context', *Vision: The Journal of Business Perspective* **22**(2), 174–184.

Subikshaa, P. and Jasmin, K. (2018), 'Stress faced by employees in information technology sector in india', *International Journal of Pure and Applied Mathematics* **119**(17), 201–206.

Tiwari, T., Singh, A. and Singh, I. (2008), 'Information technology-induced stress and human performance: A critical review', *Journal of the Indian Academy of Applied Psychology* **34**(2), 241–249.

Wheatley, D. (2017), 'Autonomy in paid work and employee subjective well-being', *Work and Occupations* **44**(3), 296–328.