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TECHNO-STRESS: MODERN DILEMMA IN THE NURSING PROFESSION?

Akram Mahdian[1], Marzieh Adel Mehraban*[2], Mousa Alavi[3]

1. *MSc Student of public health, Faculty of Nursing and Midwifery, University of Medical Sciences, Isfahan, Iran.*
2. *Assistant Professor of Nursing and Midwifery Faculty, Isfahan University of Medical Sciences, Isfahan, Iran.*
3. *Nursing and midwifery care research center, Faculty of nursing and midwifery, Isfahan University of medical sciences, Isfahan, Iran.*

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ABSTRACT

Communication and technology has made the quality of healthcare evolve, along with promoting health all over the society and they are widely deployed in healthcare service systems so that, nowadays, they are inevitably essential in healthcare. The entrance of technology to a defective system would intensify the present problems and the stress resulting from its application to users, which is called "techno-stress". In this study, we aim to evaluate the techno-stress among the nurses in selected hospitals of Isfahan in 2015.
Materials and Methods: This cross-sectional study was conducted on 190 nurses in the hospitals affiliated to Isfahan University of Medical Sciences, all of them qualified to this investigation by deploying multistage random sampling method. Questionnaire of "techno-stress and its dimensions" was the data collection tool. SPSS Statistics software was deployed to analyze the data.
Findings: The results showed that the mean score of techno-stress in the studied samples is 51.55 ± 15.607 out of 100 scores. Techno-stress has achieved the highest mean score in the field of feeling pressure and it got the lowest mean score in the technology involving.
Conclusion: The findings of this investigation proved that there is an average level of techno-stress in the studied hospitals. Therefore, nursing managers of health centers can plan for optimum usage of technology and better healthcare, based on techno-stress factors amongst the nurses in an environment where they must deal with developing technologies.

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Introduction

For many years, technology has left significant impact on the development of human relations and the progress of human civilization. Nowadays, technology has entered all aspects of human life whose great changes that are done every day, has influenced the human life more than ever. Hence, the success of governments, various industries, private and public companies and individuals in a society is dependent on the exploitation of technology [1]. Technology is regarded in many cases as a factor of progress and structural changes at organizational and national scales. According to Simatupang citing to Steel, technology should have a central role in the strategic planning of each organization to improve its services or to use the new services or to compete with other organizations [2].

Like other systems in the community, healthcare systems are growing rapidly and the application of technology is gradually growing and unavoidable, turning more attentions to focus on health technology at the beginning of this century [3]. In line with community-wide health promotion, technology and communications have made changes in the quality of healthcare. On

Corresponding Author: Marzieh Adel Mehraban, Isfahan University of Medical Sciences, Faculty of Nursing and Midwifery, Hezarjarib St., Isfahan, Iran, email: m.adel@nm.mui.ac.ir

the other hand, technology is quickly changing healthcare system [4]. Significant developments of healthcare technology have allowed the healthcare service providers to diagnose, treat and provide healthcare in a lot less time than before [5] and different professions in healthcare organizations are forced to use it as a promotion of the healthcare services offered to the recipients. The nurses are also dramatically impressed by healthcare and information technologies [6, 7]. Due to the shortage of human forces in nursing profession, and the growing number of patients, technology would support nurses to improve their performance quality. Technology, being combined with nursing, would NOT be capable to modify nurses' performance main elements; such as: gathering information, planning, intervention, evaluation, training, support, documentation, communication and interaction; but they are just expected to be improved. Participation of technology in healthcare means that there is no nurse who does NOT use the technology in the professional activities [6]. More and more use of health technology implies that nurses and other healthcare providers need more information about technology and it is clear that more comprehensive information about technology promotes its application in patient care, quality, security, and reduces care costs [8]. Systems related to the establishment and development of real time locating system, support and logistics related to patient, such as: patient discharge, moving into the residence location, education, etc. which are connected to some of the main roles of nurses and especially community health nurses [9], and the hospital management and leadership; are examples of technology used in nursing [10].

What is techno-stress?

Past literature suggests that the revolution in technology at work has caused the emergence of professional stress which would leave a negative impact on any organization performance [11, 12]. Some of these most important complications are mental tension and stress caused by the application of technology that it called "techno-stress". Other terms used for this purpose are "techno-phobia", fear of technology, and "technology aversion" [13]. This concept was invented in 1984 by a clinical psychologist. In clear words, it can be concluded that techno-stress is a modern predicament caused by inability to adapt to the modern technologies which is actually a combination of performance anxiety, a mass of information, conflict of roles, and organizational factors [14, 15]. According to Akhtari in another definition, techno-stress is a negative mental image of a modern technology [16]. Davis believes that techno-stress is an illness one contracts when they try to adapt to modern technology. Therefore, techno-stress is a result of a new and increased fear, or of difficulties associated with computers or any other modern equipment which significantly increase the stress amongst the staff (generally nurses, in this study). That's because they are commonly expected to use this modern technology through a set of daily routine despite of inadequate familiarity; which leads to imposing additional repetitive stress [17]. techno-stress is a global phenomenon and countries like the United States, China and Australia have expressed its prevalence in different percentages (25 - 39%) amongst their subsidiary organizations [16]. techno-stress emerges amongst employees due to causes like: insufficient ability and experience, feeling abhorrence of the device interruptions which require repairing, seeming obtuse, losing control, etc. [16].

Techno-stress has five different dimensions including: 1) Techno-overload, which describes situations where technology forces users to work faster and longer. 2) Techno-invasion, which describes the invasive effect of technology in situations where employees can be reached anytime while they feel the need to be constantly connected, thus blurring work-related and personal contexts. 3) Techno-complexity, which describes situations where the complexity associated with technology leads users to feel inadequate with regard to their computer skills and forces them to invest time and effort in learning and understanding the technologies. 4) Techno-insecurity, which is associated with situations where users feel threatened about losing their jobs, either because of automation from technology or to other people who have a better understanding of technologies. 5) Techno-uncertainty, which refers to contexts where continuing technology changes and upgrades, unsettles users and creates uncertainty so that they need to constantly learn and educate themselves about new technologies [17, 18].

According to Bloom, some of the main reasons for techno-stress are insufficient experiences and skills, and feeling abhorrence of seeming obtuse, and also, performance anxiety, lack of training, organizational factors, enormous amounts of labor and information, quick changes and insufficient number of staff [19].

According to studies, a person experiences stress as an internal feeling when they are exposed to new technology; but some physical symptoms also occur such as: increased mistakes and absence from work, depressed mood, lack of confidence, frustration, irritability, anger, fatigue and lack of concentration [14].

Material and Methods

The present study is a descriptive and correlational research which uses quota sampling method in which the sample size of each hospital was determined. The research population includes nurses working in the hospitals affiliated to Isfahan University of Medical Sciences in 2014. The samples needed were randomly selected out of those who had the inclusion criteria including: at least two years of work experience in the hospital, the tendency to cooperate, and working in the hospitals affiliated to Isfahan University of Medical Sciences (not as healthcare supervisors). The sample size of this research was determined based on the formula $n = z^2s^2/d^2$ at a reliability factor of 95%, an accuracy of 0.1s, and a minimum sample size of 190. The techno-

stress questionnaire designed by Ragu-Nathan et al., (2008) was deployed to assess the techno-stress and its dimensions among the nurses. This questionnaire includes questions about demographic characteristics such as age, education, gender, work experience, position, ward, kind of hospital, employment status, work shift, as well as 20 questions about techno-stress and nursing staff view about it in each of the five dimensions already given. Dimensions 1, 4, and 5 involve four questions whilst dimensions 2 and 3 involve three and five questions, respectively. The perceptions of the respondents was classified based on Likert scale into positive attitudes (for choices "completely agree" and "agree"), versus negative attitudes (for the choices "completely disagree" and "disagree"). The Persian version of this questionnaire is suggested and reviewed by Akhtari et al. in 2013 to evaluate techno-stress amongst the staff working in Mahshahr petrochemical plant. In this study, Cronbach's alpha coefficient for the questionnaire was 0.824, which indicates its reliability. The reliability of the questionnaire in a pilot study was calculated 0.824 deploying Cronbach's alpha method. The questionnaires of this study were distributed and collected after obtaining written permission from Isfahan University of Medical Sciences, and getting permission from the authorities of Nursing and Midwifery, Isfahan University of Medical Sciences, in the educational hospitals affiliated to the University, and after explaining the purpose of the study for the relevant authorities, and obtaining written consent form the participants. Descriptive statistics (mean, standard deviation) were deployed in order to analyze the data. Statistical analysis was performed deploying SPSS 20 software.

Before performing this research, an official license with number 393830 was obtained from research ethics committee in order to considering moral standards in this study. Furthermore, written consent was obtained from all units, and all of them were given reassurance about the confidentiality.

Findings

The majority of the studied sample (50.3 %) were aged 30-40 years; and regarding gender, most of it (87.7%) were women. Also, those in the sample with work experience of 5 to 10 years were the largest proportion (30.8%) with a little advantage to the proportion of those with work experience of 10 to 15 years. 86.2% of the sample were nurses, and 90.3% of them had a bachelor's degree in nursing. 72.3% of the sample had rotating shifts of whom the largest group, regarding employment status, were the contract staff with a proportion of 43.6 % (Table 1).

Table 1. Demographic characteristics of Nurses

Traits	Divisions	Frequency	Frequency Percentage
Age	20 - 30	48	24.5
	30 - 40	89	50.3
	40 - 50	43	22.1
	More than 50	6	3.1
Gender	Male	24	12.3
	Female	171	87.7
Labor Background	Less than 5 years	33	16.9
	5 – 10 years	60	30.8
	10 – 15 years	57	29.2
	More than 15 years	45	23.1
Appointment	Nurse	168	86.2
	Matron	19	9.7
	Stuff	4	2
	Paramedic	4	2.1
Education	Diploma	4	2

	Associate of Science	5	2.6
	Bachelor of Applied Science	176	90.3
	Master of Public Health	9	4.6
	Doctor of Medicine	1	0.5
Labor Periodicity	Part Time	141	72.3
	Full Time	54	27.7
Employment Status	Regular	48	24.7
	Contribution	62	31.7
	contractual	85	43.6

As seen in (Table 2), the mean total score of techno-stress in the studied units was (51.55 ± 15.07), in which the mean total score of techno-stress in the feeling of pressure was the highest (58.4 ± 21.53), and technology involvement achieved the lowest score (45.34 ± 23.24). The findings also showed that the nursing staff was moderate in average regarding techno-stress.

Table 2. The mean score and standard deviations of techno-stress overall score and its dimensions in the research subjects (number of samples: 195)

techno-stress Dimensions	Min. Score	Max. Score	Mean Score	tandard Deviation
Overload	12.50	100	58.4	21.53
invasion	0.00	100	45.34	23.24
Complexity	15.00	100	55.17	16.9
Insecurity	0.00	93.75	44.83	16.9
Uncertainty	18.75	100	-59.8	16.8
Total	20.31	92.19	51.55	15.07

Discussion and conclusion

The findings also showed that the nursing staff was moderate in average regarding techno-stress. The relative high score of techno-stress, extracted from the present survey says that there is a lack of attention to this phenomenon in the nursing profession and hospitals. Despite frequent queries all over the scientific websites, the authors of the present research found that the only available work about techno-stress which is implemented in Iran was the work of Akhtari et al., (2013) [16], entitled: “The impact and consequences of techno-stress on the users of organizations” performed on a 66 personnel sample of staff working for the control unit of Mahshahr Shahid Tondgooyan Petrochemical Plant whose results showed that insufficient motivation and excessive focus on technology in the organizations increase techno-stress. That study showed direct relationship between techno-stress and the two factors (namely: lack of motivation and excessive focus) ($p < 0.05$). However, there are NOT any statistics available about techno-stress in Iran, particularly in nursing. Techno-stress is a global phenomenon, in a way that the United States, China, and Australia have given different percentages of techno-stress amongst their organizations (25% - 39%) and have acknowledged that this prevalence amount of techno-stress is alarming [16].

In a qualitative investigation titled “An analysis of the concept techno-stress in nursing”, Abuatiq indicates that nurses basically suffer stress due to dealing with various devices. Some of the emotions that nurses have experienced while working with technology include: fear of clicking or pressing wrong buttons, issuing an incorrect command or order, being forced to trust the machine instead of people, and headaches and spasms caused by working with various types of equipment. Thus, this study confirms the presence techno-stress among nurses which tallies with our present study [20].

From other studies that have been done in this regard, we can mention the work of Okebarams which reports the amounts of techno-stress in the studied samples as follows: very high (14.3%), high (7.66%), low (9.5%), and very low or unspecified (0%) [14]. The results of that study suggest that the amount of techno-stress in many organizations is high. He has cited the

following reasons for techno-stress in various organizations: inexperience and lack of skill, anxiety, abundant mass of required information, rapid policy changes, increased demand and being overloaded with tasks versus staff shortage.

On the other hand, the emergence of techno-stress has been intensified amongst the obsessive over-users of technology according to a study entitled "The Dark Side of Technology" [21]. Also, based on a study entitled "Techno-stress and Life Satisfaction: a study on the effect of cultural attitudes and norms on the use of technology", Nilon says that mandatory use of technology leads to techno-stress. In addition, there is a significant inverse relationship between techno-stress and life satisfaction [22].

The dimensions "techno-overload" and "techno-insecurity" have respectively obtained the highest and the lowest scores in our study. Against our expectations, our results indicate a positive attitude towards "techno-uncertainty". Some previous studies about techno-stress dimensions are as follows:

Based on a study by Wetrz Evans entitled "Understanding the Efficiency and Techno-stress amongst Oncology Nurses", deploying an electronic health record (EHR) to enhance the safety, quality and effectiveness of care for cancer patients, 67.9% of the sample units agreed that they have encountered an assignment overload since the arrival of technology because they had to change their work habits to adapt to the modern technologies. 74% of the nurses felt they lack job security and thought that the knowledge of deploying modern technology is less likely to be shared among their colleagues for fear of being replaced. 61.6% of the nurses have complained frequent updating of the systems and equipment. According to this researcher, all these factors increase techno-stress amongst the nurses which reduces their efficiency. In the study mentioned, the highest score was for "techno-insecurity" to which the lowest score is allocated amongst the dimensions according to our present study [23]. By Wetrz Evans, and also according to both Cross and Veer, nurses believe that technology application and adaptation will toughly make them anxious if their colleagues and other medical professionals do not support them [24, 25]. This sort of result diversity is because of policy-making diversity and careless career promoting and rewarding for the employees and the staffs among some of the studied hospitals. This shows, more than ever, the necessity and importance of meritocracy in health systems. The dimension of "techno-overload" - whose score is the highest in the present study - tallies with Adel Mehraban's investigation in which the nurses have regarded the technology as a modern predicament because it imposes more responsibilities, rather than being helpful. Lack of special operators - particularly in the cases related to computer and EHR systems - has resulted in nurses' discontent with technology due to imposing more responsibilities. Repetitive records in EHR system, whose necessity is NOT clear to the nurses while it is ineffective in improving patient care; just increases the pressure of deploying this technology [26].

However, techno-overload has obtained the lowest score in Wetrz Evans' study. Our result was different. This can be because of limited acquaintance with technology usage in the healthcare systems among the research samples in Iran, compared to those of the developed countries. Also, techno-uncertainty, in Wetrz Evans' study, unlike the present study, showed NO inverse relationship result which implies positive attitudes among the research units towards it whilst, in other studies, this dimension has been evaluated as a negative destructive dimension upon the staff of organizations. On the other hand, according to Akhtari whose sample was selected from the staff of 'Mahshahr Petrochemical Plant, techno-complexity obtained the highest and techno-insecurity obtained the lowest score, which agrees with the results of the present research regarding insecurity and complexity dimensions [16]. But techno-complexity dimension has obtained the highest score according to Tarafdar [18]. However, it should be noticed that industrial plants in Iran apply more complex technology than that used in healthcare centers to which modern technologies arrive rarely. Apparently, different research environments and samples would lead to different results [27,28] .

By our research, it could be mentioned that the arrival of technology in the healthcare workplaces causes negative emotions in the nurses. Other studies also confirmed the statement that considering the emotions and reactions of users plays a major role in survival of technology in organizations; and this is economically more reasonable. Therefore, senior nursing officers and hospital deans should plan appropriately to confront tech-stress in order to make optimum usage of technology and reach high quality healthcare in workplaces.

Some limitations of this research were: 1) mental situation of the respondents while answering questions; 2) nurses' different inspirations for answering questions; 3) the effects of personal life stresses on the calculated amount of techno-stress.

This research was performed only in the teaching hospitals affiliated to "Isfahan University of Medical Sciences". Other similar researches should be done about techno-stress in a wider range, for instance, in public or private hospitals and in other Iranian provinces and other departments separately; also in other healthcare sections other than nursing section. Finally, some kind education about the strategies of demolishing techno-stress should be provided, based on the results of such researches.

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References

1. Department of technology management affiliated to industrial management organization. technology management: the precondition for competitiveness in it / strategic management. t m j, issue 140, 2003.
2. Simatupang T. A Study Of Technology Acquisition Modes:The Choice Between Making And Buying technology. Doctor Of Philosophy Thesis Submitted In Fulfilment Of The Requirements For The Degree Of Doctor Of Philosophy, RMIT University. Australia.2009.p.135-42.
3. Farzandipour M , Sadughi F , Meidani Z. Hospital Information Systems User Needs Analysis: A Vendor Survey. JHIDC.2011;5(1):147-8.
4. Ramundo Debby, MSIT, BSN, RN. New Technologies to Enhance Nursing Practice Nursing. 2012;7(3)40-2.
5. Pickney JM. Nurses work environment and technological innovation adoption: acquiring knowledge after making sense of it all. master's thesis. Uni NCCH. 2008
6. Roux G M. , Halstead J A. Issues and Trends in Nursing : Essential Knowledge for Today and Tomorrow, Sudbury, Mass. Jones And Bartlett Publishers. 2009.pp.27-61.
7. Reichertz P. Hospital Information System. Int J Med Inform. 2006;75(3-4):268-81.
8. Theist CB. Effective Management of Technology Implementation. J Healthc Manag.2007;52:216-9.
9. Hussaini SV, Ja'fari N. Public Healthcare Nursing II: Based on M.A. Syllables. Tehran, Jame,ehnegar Publications،2010.
10. Ramundo Debby, MSIT, BSN, RN. New Technologies to Enhance Nursing Practice Nursing. 2012;7(3):40-2 .
11. Gallie D. Work Pressure in Europe: Trends and Determinants. Bri J Indu Relat, 2005;43(3):351-75.
12. Laff M.. Got Stress? Technology and Development. 2006;60 (7): 31-6.
13. Clark CCH . Creative Nursing Leadership and Management. 2009; pp:74-5 .
14. Okebaram Moses Sunday. Minimizing the Effects of techno-stress in Today's Organization. IJETAE. 2013;3(11):649-58
15. Burke Mary Ann Stark.Technological Stressores of Louisiana Baccalaureate Nurse Educator. Submitted to the Graduate Faculty of the Louisiana State University and Agricultureal and mechanical College .2005.
16. Akhtari P , Mohseni M , Naderi M. The effect of Organizational Environment on techno-stress of Employee. IJCMSS. 2013;1(1):9-14 .
17. Ragu-Nathan TS, Monideepa Tarafdar, Bhanu S. Ragu-Nathan. The Consequences of techno-stress for End Users in Organizations: Conceptual Developmen and Empirical Validation. Information Systems Research. 2008;19(4):417-33 .
18. Tarafdar M., Tu Q., Ragu-Nathan, B. S., and Ragu-Nathan, T. S. The Impact of techno-stress on Role Stress and Productivity, J Manag Info Sys.2007;24(1):301-28.
19. Bloom A.J. An anxiety management approach to computer Phobia. TDJ. 1985; (39)1: 90 -2 .
20. Abatiq Alham. Concept Analysis of techno-stress in Nursing. Int J Nur Clinic Prac. 2015;2:110-4.
21. Salanova ,Marisa ,Llorens,Susana,Cifre,Eva. The Dark Side of Technologies: Technostrss among Users of Information and Communication Technologies. Int J Psychol. 2013;48(3): 422-36.
22. Nolin, Miki S., The Influence of Cultural Attitudes and Norms on Smartphone Use, techno-stress, and Life Satisfaction, University of Tennessee Honors Thesis Projects,2015. http://trace.tennessee.edu/utk_chanhonoproj/1824

23. Wertz evans. Elizabeth,Understanding Productivity and techno-stress for Oncology NursesUsing an Electronic Health Record (EHR) to Increase Safety, Quality, and Effectiveness of Care. ProQuest LLC 2013.

24. Cross, B. L. Developing a Relationship with the Computer in Nursing Practice: A Grounded Theory. M.N. MR80337, University Of Victoria. 2013;45(1):114-37.

25. Veer, A. J. M. A. F., Nienke Bekkema And Anneke L Francke. Successful Implementation of New Technologies in Nursing Care: A Questionnaire Survey Of Nurse users. BMC Medical Informatics and Decision Making. 2011;11:6.

26. Darvishi M. Antibiotic Resistance Pattern of Uropathogenic Methicillin-resistant Staphylococcus aureus Isolated from Immunosuppressive Patients with Pyelonephritis. Journal of Pure and Applied Microbiology. 2016;10(4):2663-7.

27. Nemati A., Faizi I., Tazakorie Z., Mirbabazadeh .4, Comparative study of dietary habits and physical activities of women aged under and over 40 years with breast cancer. Biomed Pharmacol J.2017;10 (2):847-54.

28. Mehraban A ,Hassanpour M, Yazdannik M, Ajami A, Muhammadi S. A Study on the Concept of Technology and Its Usage in Nursing. PhD. Thesis of nursing, Faculty of Nursing and Midwifery, Isfahan Uni M S. Iran J Nurs Midwifery Res. 2013;18(3): 202-7.