

**INVESTIGATING THE IMPACT OF SELF
EFFICACY AND ACTIVELY CARING ON
SAFETY BEHAVIOUR:
A STUDY AMONG MEDICAL
LABORATORY TECHNOLOGIST**

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By

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**Dissertation Submitted to
Othman Yeop Abdullah Graduate School of Business,
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in Fulfillment of the Requirement for the Degree of Master of Science**

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ABSTRAK

Tujuan utama kajian ini adalah untuk meneliti dan mendapatkan pemahaman yang lebih mendalam mengenai hubungan antara efikasi diri dan keprihatinan aktif ke atas gelagat keselamatan. Satu kajian telah dijalankan di kalangan 145 juruteknologi makmal perubatan. Data yang dikumpul melalui soal selidik telah dianalisis dengan menggunakan pakej statistik iaitu *SPSS* versi 17.0. Objektif kajian telah dijawab dengan menggunakan analisis statistik yang relevan. Hasil kajian menunjukkan bahawa terdapat hubungan positif antara efikasi diri dan keprihatinan aktif terhadap gelagat keselamatan. Kajian juga mengemukakan maklumat yang berguna untuk membantu program intervensi gelagat keselamatan yang memberi tumpuan kepada ciri-ciri individu. Saranan baru untuk pembangunan rangka kerja teori dan penyelidikan juga dicadangkan untuk penyelidikan pada masa hadapan agar ia menjadi lebih komprehensif dan menyeluruh.

Kata-kunci: Efikasi diri, Keprihatinan aktif, Gelagat keselamatan

ABSTRACT

The main purpose of this study is to examine and gain a better understanding of the relationships between self efficacy and actively caring on safety behaviour. A cross sectional study was carried out among 145 medical laboratory technologists. Data which was gathered through a questionnaire survey which was analyzed using the statistical package for social science (SPSS) software 17.0. The research objectives were answered using the relevant statistical analyses. The results indicated that there is a positive relationship between self efficacy and actively caring on safety behaviour. This study also provided information considered useful for framing future research on safety intervention programmes that focuses on characteristics of individuals. New directions for future theoretical framework development and research are suggested for future research to be more complete and comprehensive.

Keywords: Self-efficacy, Actively caring, Safety behavior

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If I have the belief that I can do it, I shall surely acquire the capacity to do it even if I may not have it at the beginning. Mahatma Gandhi

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LIST OF ABBREVIATIONS

MLT(s)	Medical Laboratory Technologist(s)
IMR	Institute of Medical Research
PPUM	University Malaya
HUKM	University Kebangsaan Malaysia
LAI	Laboratory-acquired infection
OSHA	Occupational Safety and Health Administration
ISO	International Organization for Standardization
CDC	US Centres for Disease Control
WHO	World Health Organization
PPE	Personal Protective Equipment
BSC	Biological Safety Cabinet
BSL-2	Biosafety level-2
BBS	Behaviour based safety
SCT	Social Cognitive Theory
OSH	Occupational health and safety
SPSS	Statistical Package for the Social Sciences

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The medical laboratory services in Malaysia were established at the end of the 19th century to support the development of medical practices in this country. In 1980, the annual workload reported by the laboratory service in each state ranged from 200,000 to 650,000 tests (Singh RB, 1982). In Malaysia, the majority of laboratory technologists work either in public hospital laboratories and research institutes such as the Institute of Medical Research (IMR). Some are also employed in Government University laboratories like those set up by University Malaya (PPUM) or University Kebangsaan Malaysia (HUKM). Others work in laboratories that are set up by private universities as well as privately owned clinical laboratories (Jegathesan, 1982). With the introduction of organised training programmes for medical laboratory technologists (MLT) in many government and public Universities in Malaysia, the number of trained medical laboratory technologists has increased considerably. With rampant advances in technological development in the 21st century, currently a variety of laboratory tests and investigations that provide precise analytical data are available to help physicians make accurate diagnosis. It was estimated that about 240 million pathology laboratory tests were performed in Malaysia in 2006.

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REFERENCES

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science*, 9, 75-78
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual review of psychology* (Vol. 52, pp. 1-26). Palo Alto, CA: Annual Reviews.
- Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies*. New York: Cambridge University Press.
- Bochner, S. (1994). Cross-cultural differences in the self-concept: A test of Hofstede's individualism/ collectivism distinction. *Journal of Cross-Cultural Psychology*, 25, 273-83.
- Bornstein, M. H. (1995). Form and function: Implications for studies of culture and human development. *Culture and Psychology*, 1, 123-137.
- Boyer, D. A., Zollo, J. S., Thompson, C.M., Vancouver, J.B., Shewring, K., Sims, E. (2000, June). *A quantitative review of the effects of manipulated self-efficacy on performance*. Poster session presented at the annual meeting of the American Psychological Society, Miami, FL.
- Broadbent, DG 2004, 'Maximizing safety performance via leadership behaviours' *Paper presented at the 28th World Congress of Psychology, Beijing, China*.
- Carder, B. (1994). Quality theory and the measurement of safety systems. *Professional Safety*, 39 (2), 23-28
- Cellar, D. F., Nelson, C. M., & Bauer, C. (2001). The five factor model and safety in the workplace: Investigating the relationships between personality and accident involvement. *Journal of Prevention and Intervention in the Community*, 22(1), 43-52.
- Copper, R. K., & Sawaf, A. (1997). *Executive EQ: Emotional intelligence in leadership and organization*. New York: Grosset-Putnam.

- Cooper, M, Philips, R, Sutherland, V & Makin, P 1994, 'Reducing accidents using goal setting and feedback: a Weld study', *Journal of Occupation and Organizational Psychology*, vol. 67, pp. 219–240.
- CDC/National Institutes of Health. Biosafety in microbiological and biomedical laboratories. 5th edition. Available at <http://www.cdc.gov/biosafety/publications/bmbl5/BMBL.pdf>.
- Clinical and Laboratory Standards Institute. Protection of laboratory workers from occupationally acquired infections; approved guideline—fourth edition (CLSI document M29-A4). Wayne, PA: Clinical and Laboratory Standards Institute; 2011.
- Chhokar, J.S., Wallin, J.A., 1984. Improving safety through applied behavior analysis. *Journal of Safety Research* 15(4), 141-151.
- DeJoy, D. M. (1990). Toward a comprehensive human factors model of workplace accident causation. *Professional Safety*, 35, 11-16.
- DeJoy, D. M. (1994). Managing safety in the workplace: An attribution theory analysis and model. *Journal of Safety Research*, 25(1), 3-17.
- DeJoy, D. M. (1996). Theoretical models of health behavior and workplace self protective behavior. *Journal of Safety Research*, 27(2), 61-72.
- Department of Labor, Department of Health and Human Services. Joint advisory notice: protection against occupational exposure to hepatitis B virus (HBV) and human immunodeficiency virus (HIV). Washington, DC:US Department of Labor, US Department of Health and Human Services, 1987.
- Dr.Cooper, M. D. (2003, April). Behavior based safety still a viable strategy. *Safety and Health Journal* 46–48.
- Geller, E. S. (1994). Ten principles for achieving a Total Safety Culture. *Professional Safety*, 39(9), 18-24.
- Geller, E. S. (1995). *Beyond safety accountability: How to increase personal responsibility*. Neenah, WI: J.J. Keller & Associates, Inc.
- Geller, E. S. (1998b). *Understanding behavior-based safety: Step-by-step methods to improve your workplace* (Revised Edition). Neenah, WI: J.J. Keller & Associates, Inc.
- Geller, E. S. (2000). Maintaining involvement in occupational safety: Fourteen key points. *Occupational Health & Safety*, 69(1), 72-86.
- Geller, E. S. (2001). *Working safe: How to help people actively care for health and safety*, 2nd ed. New York: Lewis.

- Geller, E. S. (2001a). Actively caring for occupational safety: Extending the performance management paradigm. In C. M. Johnson, W. K. Redmon, & T.C Mawhinney (Eds.), *Organizational performance: Behavior analysis and management*. New York: Springer.
- Geller, E. S. (2002). Sustaining participation in a safety improvement process: Ten relevant principles from behavioral science. *Professional Safety*, 46(9), 24-29.
- Geller, E. S. (2002b). People-based safety: Seven social influence principles to fuel participation in occupational safety. *Professional Safety*, 47(10), 25-31.
- Geller, E. S., & Wiegand, D. M. (2005). People-based safety: Exploring the role of personality in injury prevention. *Professional Safety*, 50(12), 28-36.
- Geller, E. S., & Williams, J. H. (2001). *Keys to behavior-based safety*. Rockville, MD: ABS Consulting.
- Gielen, A. & Sleet, D. (2003). Application of Behavior-Change Theories and Methods to Injury Prevention. *Epidemiologic Reviews*, 25, 65-76.
- Guidelines on minimum qualifications, training and experience of professional personnel working in a pathology laboratory (Version 1/2004). *Malays J Pathol* 2005: 27: 57-62.
- Guidelines on safe laboratory practice.(Version 1/2004). *Malays J Pathol* 2005: 27: 71-73.
- Haapala, I., & Probart, C. (2004). Food safety knowledge, perceptions, and behaviors among middle school students. *Journal of Nutrition Education and Behavior*, 36(2), 71-76.
- Harrington J. M, Shannon H. S. Survey of safety and health care in British medical laboratories. *Br Med J*. 1977 Mar 5 ; 1(6061):626–628.[PubMed].
- Hofmann, D. A., & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviors and accidents. *Personnel Psychology*, 49, 307–339.
- Herwaldt, BL. Laboratory-acquired parasitic infections from accidental exposures. *Clin Microbiol Rev* 2001;14:659–88.
- Heinrich, H. W. (1931). *Industrial accident prevention: A scientific approach*, 4th New York: McGraw-Hill.
- Heinrich, H. W. (1959). *Industrial accident prevention: A scientific approach*, 4th New York: McGraw-Hill.

- Jegathesan M, de Witt GF. Organisation of the laboratory services in Malaysia. *Malays J Pathol*; 1982; 5: 1-5.
- Karim N. and Cheo CK: Laboratory accident- a matter of attitude. *The Malaysian Journal of Pathology* 2000 Dec;22(2):85-9 (2000).
- Keppel, G. (1991). Design and Analysis: A researcher's handbook (3rdEd.). Englewood Cliffs, NJ: Prentice Hall.
- Kohlberg, L. (1969). Stage and sequence: The cognitive developmental approach to socialization. In D. A. Goslin (Ed.), *Handbook of Socialization Theory and Research* (pp. 347-480). New York: Rand McNally.
- Komaki, J., Barwick, K. D., & Scott, L. R. (1978). A behavioral approach to occupational safety: Pinpointing and reinforcing safe performance in a food manufacturing plant. *Journal of Applied Psychology*, 63(4), 434-445.
- Krause, T. R. (2001). Second generation in behavior-based safety. *Professional Safety*, 46(5), 27-33.
- Looi LM. Development of guidelines on pathology laboratory practice. *Malays J Pathol* 2005; 27: 1.
- Looi LM. Medicine in Malaysia: Pathology. *Med J Malaysia* 1995; 50 (Suppl. A): S51-55.
- Maddux, J. (Ed.) (1995). Self-efficacy, adaptation, and adjustment: Theory, research, and application. New York: Plenum
- Maraculo, L.A., & Serlin, R.C. (1988). Statistical methods for the social and behavioral sciences. New York: Freeman and Company.
- Marcel Simard & Alain Marchand (1997): Workgroup's propensity to comply with safety rules: the influence of micro-macro organisational factors, *Ergonomics*, 40:2, 172-188
- McAfee, R. B., & Winn, A. R. (1989). The use of incentives/feedback to enhance workplace safety: A critique of the literature. *Journal of Safety Research*, 20, 7-19.
- McSween, T. E. 2003. *The values-based safety process: Improving your safety culture with behavior based safety* (2nd Edition). Hoboken, NJ: John Wiley & Sons, Inc
- Medeiros, L., Hillers, V., Kendall, P., & Mason, A. (2001). Evaluation of food safety education for consumers. *Journal of Nutrition Education*, 33, S27-S34.

- Meyer-Bahlburg, H. F. L., Sandberg, D. E., Dolezal, C. L., & Yager, T. J. (1994a). Gender-related assessment of childhood play. *Journal of Abnormal Child Psychology*, 22, 643-660.
- Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science*, 34, 99-109.
- Neal, A., & Griffin, M. A. (2004). Safety climate and safety at work. In M. R. Frone & J. Barling (Eds.), *The psychology of workplace safety* (pp.15-34). Washington, DC: American Psychological Association.
- Norazah A. Mazlah A, YM Cheong & A.G Mohammed Kamil Laboratory Aquired- Maurine Typhus- A case report .Med J Malaysia Vol 50 No 2 June 1995
- Occupational Safety and Health Administration. Occupational safety and health standards. I. Personal protective equipment. 1910.133, Eye and face protection. Available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9778
- Pathology Laboratory Act 2007 (Act 674). Kuala Lumpur: Percetakan Nasional Malaysia Berhad. August 2007.
- Petersen, D. Analyzing Safety System Effectiveness (1996, Van Nostrand Reinhold).
- Pettinger, C.B., Jr., Michael, P.G., & Buscemi, N.V. (May, 1998). *Critical Success Factors for Behavior-Based Safety: Does Employee Involvement Make a Difference?* Paper presented at the 24th Annual Convention of the Association for Behavior Analysis, Orlando, Florida.
- Pidgeon, N. F. (1991). Safety culture and risk management in organizations. *Journal of Cross-Cultural Psychology*, 22, 129-141.
- Pike RM. Laboratory-associated infections: incidence, fatalities, causes and prevention. *Annual Rev Microbiol* 1979;33:41-66.
- Ray, P. S., Purswell, J. L. & Bowen, D. (1993) Behavioural safety program: Creating a new corporate culture. *International Journal of Industrial Ergonomics*. 12: 193-198.
- Reber, R. A., Wallin, J. A., & Chhokar, J. S. (1984). Reducing industrial accidents: A behavioral experiment. *Industrial Relations*, 23(1), 119-125.
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. *Health Education Quarterly*, 1.5, 175-183.

- Sadri, G., & Robertson, I. T. (1993). Self-efficacy and work-related behavior: A review and meta-analysis. *Applied Psychology: An International Review*, 42, 139-152.
- Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist*, 26(3 &4), 207-231.
- Schroeder, D. A., Penner, L. A., Dovidio, J. F., & Piliavin, J. A. (1995). *The Psychology of Helping and Altruism*. New York: McGraw-Hill, Inc
- Schwarzer, R. (Ed.) (1992). *Self-efficacy: Thought control of action*. Washington, DC: Hemisphere.
- Schwarzer, R. (1993). Measurement of perceived self-efficacy. Psychometric scales for cross-cultural research. Berlin, Germany: Freie Universität Berlin.
- Schwarzer, R. (1994). Optimism, vulnerability, and self-beliefs as health-related cognitions: A systematic overview. *Psychology and Health: An International Journal*, 9, 161-180.
- Sean G. Kaufman, Biosafety "Behavioral-Based" Training for High Biocontainment Laboratories: Bringing Theory into Practice for Biosafety Training - *Applied Biosafety: Journal of the American Biological Safety Association* (in publication).
- Sean, G. K, Mathews, H., & Alderman, L. M. (2007). Biosafety Officers, Behavioral Compliance Strategies, and Their Effects on Laboratory Practices. *Journal of the American Biological Safety Association*, 12,75.
- Sewell DL. Laboratory-associated infections and biosafety. *Clin Microbiol Rev*. 1995; 8:389-405.
- Shelton, S. (1990). Developing the construct of general self-efficacy. *Psychological Reports*, 66, 987-994.
- Shields, M. A. (1994). Human relations in safety. *Professional Safety*, 39, (2), 40-42.
- Singh RB. Historical development of the laboratory services in Malaysia. *Malays J Pathol* 1982; 5: 23-32.
- Smith, M. J., Anger, W. K., & Ulsan, S. S. (1978). Behavioral modification applied to occupational safety. *Journal of Safety Research*, 10(2), 87-88
- Speech by the Deputy Prime Minister of Malaysia at the Opening of the 24th World Congress of Pathology and Laboratory Medicine, Kuala Lumpur, Malaysia. August2007.

- SPSS Statistics Base 17.0 User's Guide (2007). Chicago, IL: SPSS Inc. ©
- Stajkovic, A. D., & Luthans, F. (1998). Self-efficacy and work-related performance: A meta-analysis. *Psychological Bulletin*, *124*, 240-261.
- Sulzer-Azaroff, B., & Austin, J. (2000). Does BBS work? Behavior-based safety and injury reduction: A survey of evidence. *Professional Safety*, *45*(7), 19-24.
- Swarz G, ed. Safety culture and effective safety management. Chapter 2. Chicago, IL: National Safety Council; 2000.
- Telch, M. J., Bandura, A., Vinciguerra, P., Agras, A., & Stout, A. L. (1982). Social demand for consistency and congruence between self-efficacy and performance. *Behavior Therapy*, *13*, 694-701.
- Valerie J Grant, Elizabeth Robinson, Paul Muir : Sex ratios in healthcare occupations: population based study *BMJ*. 2004 January 17; 328(7432)
- Weinstein, M. B. (1998). Improving behavior-based safety through TQM. *Professional Safety*, *43*(1), 29-35
- World Health Organization. Laboratory biosafety manual. 3rd edition. 2004. 2004.<http://www.who.int/csr/resources/publications/biosafety/en/Biosafety7.df> (Last accessed 15 April 2012)
- Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology*, *65*(1), 96-102.
- Zohar, D. (2002). Modifying supervisory practices to improve subunit safety: A leadership-based intervention model. *Journal of Applied Psychology*, *87*(1), 156-163.
- Zohar, D., & Luria, G. (2005). A multilevel model of safety climate: Cross-level relationships between organization and group-level climates. *Journal of Applied Psychology*, *90*(4), 616-628.
- Zwerling C, Daltroy LH, Fine LJ, Johnston JJ, Melius J, Silverstein BA. Design and Conduct of Occupational Injury Intervention Studies: A Review of Evaluation Strategies. *Am J Ind Med* 1997;32:164-79.