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Understanding the Determinant Factors of Chronic Disease Behaviour among Malaysian Low-Income Workers: An Integrated Model Approach

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Abstract

Chronic disease is a public health concern all around the world including Malaysia. It is reported to be increasing and becoming one of the major problems among the community. This issue, however, is poorly understood among low-income groups. The identifications of factors associated with chronic disease management behaviour are necessary as the strategies to reduce the prevalence of chronic disease and increase the quality of life and well-being among the unfortunate. Therefore, this study aims to understand chronic disease management behaviour among this vulnerable population. This paper illuminates the prospects via the literature overviews limitations that indicate the needs for an integrated model to identify factors influencing chronic disease management behaviour among low-income workers in Malaysia. Guided by an integrating of Theory of Reasoned Action (TRA) and Socio Ecological Model were used to understand chronic disease management behaviors among low-income workers. Hence, this paper provides important insights about the determinants of chronic disease management behaviour among Malaysian low-income workers and proposes an integrated model with the hope of looking into driving testable hypotheses to provide empirical evidence.

Keywords: Low-Income Workers, Risk Factors, Integration Model, Chronic Disease Management Behavior, Malaysia

Introduction

Chronic disease is recognized as a major challenge to public health in managing it, and it is reported to be dangerous to humans because of its difficulty to control and cure, can interfere with daily life and is often associated with various complications (Pohlit et al., 2018; Larsen,

2009; World Health Organization (WHO), 2008; UK Department of Health, 2004; McDonald, 2003).

In community, chronic disease is influenced by various factors that include unhealthy lifestyle practices, genetic factors, economic, social, gender, background, and environmental conditions (Ustun, et al., 2019; Kassa & Grace, 2018; WHO, 2017; Diem et al., 2015; Silva-Matos & Beran, 2012; Promthet et al., 2011; Negin et al., 2011).

The increase in cases related to chronic diseases does not only implicate the public, as this more worrying rise also occurs among low-income groups. This issue is increase in non-communicable diseases (NCD) among this group and they are often disregarded or seen merely as remote or secondary impacts on health and illness. Thus, they are now more commonly recognized as the root causes of health conditions, and the low-income households are exceptionally vulnerable to the risk of chronic diseases. They are seen starting to have an impact on the increase in non-communicable diseases (NCD) and they are often disregarded or seen merely as remote or secondary impacts on health and illness. In fact, they are now more commonly recognized as the root causes of health conditions, and the households are exceptionally vulnerable to the risk of chronic diseases.

Recently, public health attention has been shifted to this special/minor population, particularly low-income workers. Low-income workers have a very important role in assisting service organisations achieve their objectives in providing good services to the public. However, they are seen as a group that is more vulnerability to chronic disease compared to the higher income groups. It was noted that most studies reported low-income workers are exposed to physical and psychosocial risk in the workplace involving heavy job demands, discrimination in the workplace, and hazardous substances (Baron et al. 2014; Meyer, 2014). Literature also highlights the lack of this group in terms of social protection, access to healthcare, and healthy nutrition (Stringhini et al., 2017; Rockefeller Institute, 2013; Wilkinson & McDougall, 2007). Other studies also revealed that employment has affected the eating habits of those who live in the city, especially the low to middle income groups. This at the same time causes an impact on health problems among them (Blake, Wethington, Farrell, Bisogni & Devine, 2011). Moreover, they often work overtime to increase their income, leaving them with limited time to do physical activities (Kataria et al., 2020). According to Gawde et al (2016), people with lower socioeconomic status are more vulnerable to ill-health condition and do not have resources to deal with the consequences of the diseases. Therefore, low-income people are often exposed to NCD due to lack of knowledge, lack of resources, psychosocial stress, high-risk behaviors, unhealthy living conditions, limited access to healthcare, and low chance of preventing disease complications. As a result, they are at high risk of injury, susceptible to disease, and remain in poverty (WHO, 2005a).

Compared to the high-income and educated individuals, they have better knowledge and are more receptive to receive information about health (Gilman et al., 2008; Cowell, 2006). They also have a better awareness of health and better skills in coping with stress (Liu et al., 2015; Slopen et al., 2013), as they are having a high level of knowledge in education, thus making them able to influence someone to a healthy lifestyle and better self-control (Ross & Wu, 1995). For instance, those with high education status tend to behave in a healthy lifestyle with a high intake of fruits and vegetables, low fat intake, and active involvement in exercise and physical activity (Martin et al., 2008). On the other hand, professionals tend to have higher awareness and knowledge of a healthy lifestyle (Kit et al., 2020). Indeed, they are often accompanied by the need to look presentable and fit (Biernat & Tomaszewski, 2015). It is aligned with McLaren (2007) which stated that they are more likely to maintain their physical

appearance especially those who usually work in a higher rank of the job hierarchy. In contrast, the low-educated individuals are found less likely to be offered the opportunity to learn, and low knowledge has caused them to have low awareness and motivation, thus causing them to adopt unhealthy behaviors which in turn expose them to the risk of chronic diseases (Pampel et al., 2010).

For the reason, the need of preventing chronic illnesses with developed integrated chronic disease plan are necessary with to the identifications of factors that are correlated with chronic disease management behaviour as the strategies to reduce the prevalence of chronic disease and increase the quality of life and well-being. Hence, focus on the health of low-income workers should be given as priority in order to ensure the continuation of country's development and the well-being of the people. This is important since they are the energy source to achieve the national development and economic agenda performance (Bakar et al., 2020). Indeed, there is a need to impart chronic disease management behaviour to this high-risk groups as outlined in the Five Sustainable Development Goals (SDGs), the set targets related to reducing health inequality nationally and globally.

Theorizing Chronic Disease Management Behaviour

Theory of Reasoned Action (TRA)

In this paper, we provide a theory to gain a deeper understanding about chronic disease management behaviour. The theory of reasoned action (TRA) is among the fundamental and grounded theory to behavioural prediction which was developed by (Ajzen and Fishbein, 1975). Based on this theory, human assumptions or considerations in making rational and systematic decisions to perform a behavior or action are the result of the relationship between attitudes, subjective norms, intentions and behavior (Refer Figure 1). This theory posits that the determinants of human behavior consist of two factors that influence behavioural intentions such as attitudes toward behavior and subjective norms (Ajzen & Fishbein, 1980). According to this theory, the influence of attitudes (positive and negative individual evaluations of a behavior) and subjective norms (normative support or social pressure) are important as factors that stimulate a person's behavior. Several previous empirical studies have also supported this theory on weight loss, eating behaviors, addiction to smoking and alcohol abuse, condom use and HIV (Taylor et al., 2007). Hence, it can be concluded that this theory is able to describe the actions of individuals by identifying, measuring, and incorporating beliefs associated with individuals or groups that allow them to induce to perform behaviour.

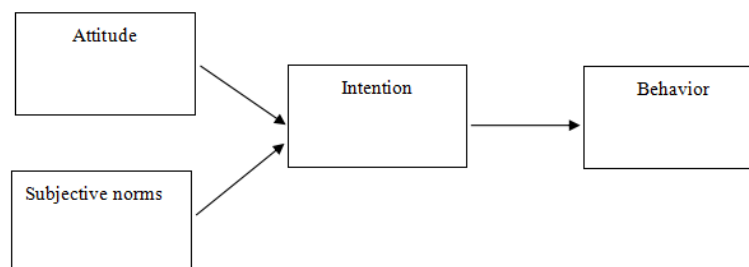


Figure 1: Theory of Reasoned Action diagram. Adapted from Ajzen & Fishbein (1985).

Socioecological Model (SEM)

In contemporary research, specific forms of health behavior tend to be combined with other disease-related elements so that a useful, multifactorial account can be established (Abraham

et al., 2000). In order to describe how individual's environments is able to influence people's health behaviour, it is important to understand their ecological framework or life, which includes macro-level factors (such as political conditions and economic strength), neighborhood factors (beliefs, cultures, norms and economic resources) and social factors (support and safety) (Blum et al., 2012). Similar to Gehlert et al (2008), they claimed that organizational, societal, and governmental factors are the determinants of health external factors for a person's control over health behaviour. Also, Stokols (1992, 1996) argues that aspects such as the social, physical, and cultural environment have cumulative effects on health. While, Noar et al (2008) asserted that the identification of factors influencing a variety of health behaviour is necessary to a theory that can encompass a wide range of human health behaviors. Similarly, Krishnan et al (2015) argued that social, cultural and behavioural factors influence the control of non-communicable disease. These shows that individual, social, cultural and political mechanisms are a complete set that are important as the determinants of health status. Therefore, a theoretical and model-focused approach is desirable to consider all health behavioural factors involving individual, social, cultural and environment or socio-ecological perspectives of human behavior.

Hence, socioecological model is applicable to understand the multifaceted and interactive effects of personal, social and environmental factors to determine behaviour and to guide health behaviour interventions (Story et al., 2008). The body of literature has suggested that this model is a comprehensive and coordinated approach for understanding and reducing disease risks, particularly among underserved and vulnerable population groups (Oetzel et al., 2006; Gregson, 2001). This statement is also supported by Baron et al. (2014), who explained the socioecological model is appropriate in providing a better understanding of the influences that can influence health outcomes and reduce health inequalities especially for low -income workers.

These models, which postulated by McLeroy et al (1988) highlights the multiple level includes intrapersonal factors (knowledge, attitude, personality, beliefs and skills), interpersonal factors (family, friends and health team), organizational factors (workplace), community factors (neighborhood, local community and community organisations) and societal factors (health policy and media advocacy) (see illustration in Figure 2).

In the study of Mahadevan (2016), socioecological model was used to study the chronic disease self-management behaviour and it has been used in past research as well to investigate on physical activity (Cervero et al., 2006). However, there is little known describing its practical in a behaviour on chronic disease management among low-income workers, leaving the issue to remain. Hence, this model is proposed to understand how individual, social, community, institutional/organizational and policy factors influence towards chronic disease management behaviour.

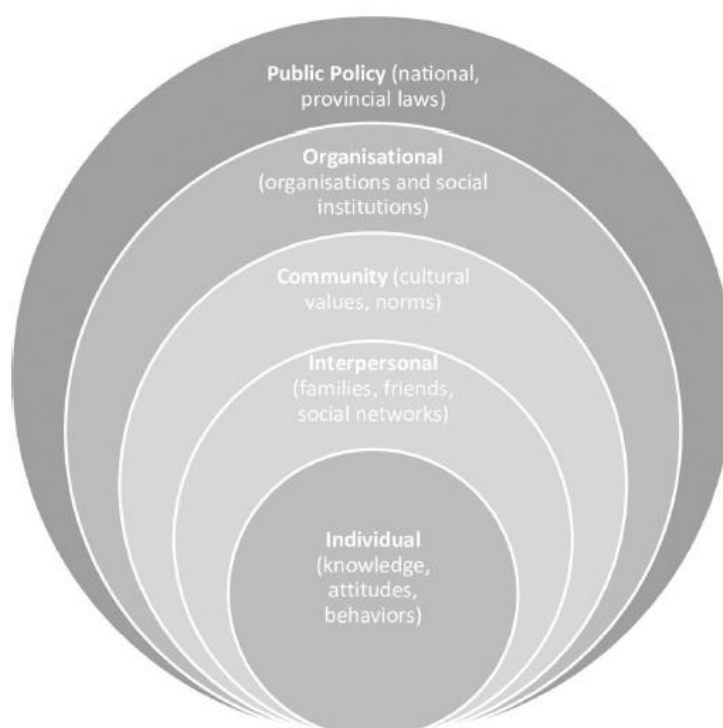


Figure 2: Socioecological model of health behaviour. Adapted from Kenneth McLeroy et al (1988).

An Overview: The determinants of chronic disease among low-income workers in Malaysia

Globally, the trend on chronic disease is seen to be increasing throughout the year almost all over the world, including in Malaysia. It was dispersed across the globe irrespective of the socioeconomic or demographic status, with a mounting tendency in low-and middle-income countries (Jain et al., 2018).

In this aspect, the emergence of non-communicable diseases does not recognize borders and geography. Although this issue is considered trivial as it involves a small number of the human population or a few infected individuals, this chronic disease however has the ability to threaten the level of health thus affecting the finances and security of the country.

It is estimated the real medical cost for chronic disease such as cardiovascular disease (CVD), diabetes and cancer in 2017 amounted to RM 9.65 billion (Ministry of Health Malaysia, 2022). The effects of this chronic disease can place an increased strain on Malaysia's health system through a rising demand for health services. In fact, it can be seen that NCD in Malaysia have accounted for more than two-thirds of the total disease burden (WHO, 2012; Disease Control Division, 2006), 73% of the causes of death in Malaysia (NHMS, 2015), and has become the main cause of death in government hospitals (WHO, 2012).

In the daily life of individuals, communities or professionals, we are often shown the neglect of the positive aspects of a healthy lifestyle. Although adults are as generally healthy (Li & Sung 1999), employment is the cause of health problems and chronic diseases. In fact, the influence of others such as friends, culture, and environment also make them susceptible to the risk of health problems and diseases. According to Ahmad, Abu and Hamzah (2013), person's behavioural actions are often influenced by various external influences or relationships with others such as family members, local community, culture and physical environment.

In Malaysia, studies have shown that low-income workers always have chronic diseases such as hypertension, diabetes, renal disease, coronary heart disease and cancer (Su et al., 2018; Eng et al., 2016; Fiidow et al., 2016; Lua et al., 2004; Khalid et al., 1990). Further, another study by Chee et al (2014) showed that abdominal obesity (77.8%) and high blood pressure (44.7%) occur among implementer group compared with professional and management group. The finding is also similar to a study by Rampal et al (2012) which revealed that non-academic position was more likely obese than staffs with academic position. Another study by Lim et al (2003) conducted among female factory workers showed that shiftwork was significantly associated with a high body mass index (BMI). Similarly, Chee et al (2004) revealed that those who work in shifts, especially working night shifts will be exposed to overweight. Poor knowledge on dietary intake, with less than 2 liters daily plain water intake were significantly related to overweight and obesity among low SES (Senior Executive Service) army personnel (Qistina et al., 2021).

Previous studies have found that low socioeconomic status, lower income levels, lack of education and non-professional employment status also contribute to the risk of chronic diseases (Scholes et al., 2012; Kivimaki et al., 2009; Kim et al., 2008; Abegunde et al., 2007; Barbeau et al., 2004; Stelmach et al., 2003; Yusuf et al., 2001; Blane et al., 1996; Adler & Ostrove, 1999). In a similar vein, Chin et al. (2014) found that socioeconomic status such as income level, educational background, employment and social support network are the significant social determinants that influence a person's health outcomes.

Subsequently, researchers often cite low-income groups as not having an access to adequate facilities in the community that provide healthy food and physical safety (Hutch et al., 2011; Woolf et al., 2011; Mujahid et al., 2008). From local empirical study by Shamsul, Jayashree and Norhasmah (2013), the result found that low-income households prefer to buy cheaper foods as an alternative for them to meet their daily needs such as rice, sugar and green vegetables over foods that are considered healthy such as fruits, vegetables and milk due to unreasonable prices in the market. Similarly, report from National Health & Morbidity Survey (NHMS) showed that the prevalence of fruit and vegetable consumption for the Bottom 40% (B40) group is inadequate, and the poorest 20% of the population has the highest level of physical inactivity (Institute of Public Health, 2015). Therefore, they are more likely to consume non-nutritious foods as the price charged is much lower (Wang et al., 2015). In addition, neighborhoods living in dense and unsafe urban environments also prevent them from being physically active, doing the walking or any other healthy activities. Kim and So (2014) stated that low socioeconomic groups were less likely to be active due to these social and environmental barriers as compared to those with high economic status. Hence, these evidences concluded that low-income workers in Malaysia are more likely to adopt an unhealthy lifestyle that lead to the development of chronic diseases due to the influence of several risk factors such as personal, social, living, working conditions, community, and environmental.

Arguably, all these aforementioned NCD have had a significant impact on low-income groups in managing their health, receiving treatment and taking care of their own wellbeing with limited sources of income. Additionally, it raises other problems with family, social relationships, emotions, work productivity and individual quality of life (Santiago et al., 2011; Muna, 2010; Alefan et al., 2009). This calls for an effort to identify and understand factors influencing behaviors to management of chronic disease among low-income.

Chronic Disease Management Behaviour Defined

The importance of chronic disease management has long been recognized. It refers to a person's ability to manage their own illness and lifestyle in collaboration with their family, community, and health care professionals (Wilkinson & Whitehead, 2009). Disease management (also referred to as self-management or self-care) is a full range of activities undertaken by individuals to promote their health, increase their physical, social or emotional resources, and prevent further deterioration of health from disease (Pincus et al., 1998). This is also agreed by Stewart et al (2000) as they explained that disease management involves collaborative management between patients and physicians in working together to identify problems, set goals, incorporate self-management strategies, monitor progress over time, leading to higher levels of trust and satisfaction, reducing emotional load, and ensuring better biomedical levels such as blood pressure, blood sugar control and others. In line with that, self-management plays an important role of individuals in managing their condition such as making decisions, adopting, and adapting strategies to improve their health status in relation to certain conditions that involve sharing support with others, such as family, friends, health providers, and community (Lorig & Holman, 2003).

Therefore, disease management is recognized as an important matter given that the workforce is composed of older adults, the prevalence of chronic conditions, and the importance of maintaining a productive and competitive workforce. In Malaysia, low-income workers or the B40 group refers to the bottom 40% of Malaysian family income. They make less money each month than RM4,850, especially Malaysian Public Sector, and they can be considered as an important asset of the country's economy and productivity in helping management or authorities maintain and improve service quality. Therefore, an emphasis on chronic disease management is important to sustain job performance, productivity and health as well as improve quality of life and a longer life expectancy.

There is growing evidence that an integrated approach acts as preventer of chronic disease and as a key determinant of individual health behaviors, through physical, social, organizational and psychosocial mechanisms (Sorensen et al., 2011). Prior research has identified that chronic disease management is associated with longer life expectancy, quality of life, life satisfaction, self-confidence, improved health outcomes, cost-effective health care, reduced morbidity and mortality rates (Reddy et al., 2012; Viswanathan et al., 2012; Hu et al., 2011; Mulyati, Yetti & Sukmarini, 2003; Uchino et al., 1996; Kaplan & Toshima, 1990). Thus, disease management is necessary to form an effective and preventive management of chronic diseases and complications of disease (Glasgow & Eakin, 1998; Gochman, 1997; Sherbourne et al., 1992).

Conclusion

In conclusion, this study is conducted to determine the factors towards chronic diseases management behaviour. It is recommended to highlight the need for comprehensive model, incorporating socioecological model and theory of reasoned action providing guidance for future researchers to undertake this research based on the review done. Thus, this theory clearly has the potential to be merged as a research framework that may provide ground for future studies to explore the integration of multiple-level such individual, social, organizational, community and societal factors. This process is also capable of contributing to the development that provides a baseline for evaluating intervention.

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References

- Abegunde, D. O., Mathers, C. D., Adam, T., Ortegon, M., & Strong, K. (2007). The burden and costs of chronic diseases in low-income and middle-income countries. *Lancet*, 370(9603), 1929–1938. [https://doi.org/10.1016/S0140-6736\(07\)61696-1](https://doi.org/10.1016/S0140-6736(07)61696-1)
- Abraham, C., Norman, P., & Conner, M. (eds). (2000). *Understanding and Changing Health Behaviour: From Health Beliefs to Self-regulation*. Amsterdam: Harwood Academic Press.
- Adler, N. E., & Ostrove, J. M. (1999). Socioeconomic status and health: What we know and what we don't. *Annals of the New York Academy of Sciences*, 896(1), 3–15. <https://doi.org/10.1111/j.1749-6632.1999.tb08101.x>
- Ahmad, J., Abu, R., Hamzah, R. (2003). Health Belief Model dan tingkah laku kesihatan. Paper presented at the Seminar Pasca Siswazah Dalam Pendidikan (GREduc 2013). 697–701. Universiti Putra Malaysia. Faculty of Educational Studies Abstract retrieved from: <https://pdfslide.tips/documents/health-belief-model-dan-tingkah-laku-kesihatan-juwariah-ahmadpdf-teori-dan.html>
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. New Jersey: Prentice-Hall.
- Ajzen, I. (1985). From Intentions to Actions: A Theory of Planned Behavior. *In Action Control*; Kuhl, J., Beckmann, J., Eds.; Springer: Berlin/Heidelberg, Germany, 11–39. ISBN 978-3-642-69748-7.
- Alefan, Q., Ibrahim, M. I, Razak, T. A., & Ayub, A. (2009). Cost of treating hypertension in Malaysia. *Asian Journal of Pharmaceutical and Clinical Research*, 2, 1–5
- Bakar, A. S. B. A., Rahman, H. A., Shahar, H. K., Nazan, A. I. N. M., & Idris, K. A (2020). Conceptual Framework of Factors Influencing Prevention-Related Practice Behaviors towards NonCommunicable Diseases (NCDs) of Low-Income Workers. *International Journal of Academic Research in Business and Social Sciences*, 10(16), 27–40. <http://dx.doi.org/10.6007/IJARBS/v10-i16/8290>
- Barbeau, E. M., Krieger, N., & Soobader, M. J. (2004). Working class matters: socioeconomic disadvantage, race/ethnicity, gender, and smoking in NHIS 2000. *American Journal of Public Health*, 94(2), 269–278. <https://doi.10.2105/AJPH.94.2.269>
- Baron, S. L., Beard, S. K., Davis, L., Delp, L., Forst, L., Kidd-Taylor, A. K., ... Welch, L. S. (2014). Promoting Integrated Approaches to Reducing Health Inequities Among Low-Income Workers: Applying a Social Ecological Framework. *American Journal of Industrial Medicine*, 57(5), 539–556. <https://doi.org/10.1002/ajim.22174>
- Biernat, E., & Tomaszewski, P. (2015). Association of socio-economic and demographic factors with physical activity of males and females aged 20–69 years. *Annals of Agricultural and Environmental Medicine*, 22(1):118-123. <https://doi.org/10.5604/12321966.1141380>
- Blake, C.E., Wethington, E., Farrell, T. J, Bisogni, C. A., & Devine, C. M. (2011). Behavioral contexts, food-choice coping strategies, and dietary quality of a multiethnic sample of employed parents. *Journal of the American Dietetic Association*, 111(3), 401–407. <https://doi.10.1016/j.jada.2010.11.012>

- Blane, D., Hart, C. L., Smith, G. D., Gillis, C. R., Hole, D. J., & Hawthorne, V. M. (1996). Association of cardiovascular disease risk factors with socioeconomic position during childhood and during adulthood. *BMJ*, 313(7070): 1434–1438. <https://doi.org/10.1136/bmj.313.7070.1434>
- Blum, R., Sudhinaraset, M., Emerson, M. R. (2012). Youth at risk: suicidal thoughts and attempts in Vietnam, China, and Taiwan. *Journal of Adolescent Health*, 50 (3), S37–S44. <https://doi.org/10.1016/j.jadohealth.2011.12.006>.
- Chee, H. L., Kandiah, M., Khalid, M., Shamsuddin, K., Jamaluddin, J., Mohd Nordin, N. A. M., ... Osman, I. (2004). Body mass index and factors related to overweight among women workers in electronic factories in Peninsular Malaysia. *Asia Pacific Journal of Clinical Nutrition*, 13, 248–254
- Chee, H. P., Hazizi, A. S., Barakatun Nisak, M. Y., & Mohd Nasir, M. T. (2014). Metabolic Risk Factors among Government Employees in Putrajaya, Malaysia. *Sains Malaysiana*, 43(8), 1165 –1174
- Chin, V. Y. W., & Noor, N. A. M. (2014). Sociocultural determinants of health and illness: A theoretical inquiry. *GEOGRAFIA OnlineTM Malaysian Journal of Society and Space*, 49 – 59
- Cox, T., Griffiths A., & Rial-Gonzalez, E. (2000). Work-Related Stress. Office for Official Publications of the European Communities, Luxembourg
- Cowell, A. J. (2006). The relationship between education and health behavior: some empirical evidence. *Health Economics*, 15(2), 125 – 146. <https://doi.org/10.1002/hec.1019>
- Detaille, S. I., Haafkens, J. A., & Van Dijk, F. J. H. (2003). What employees with rheumatoid arthritis, diabetes mellitus and hearing loss need to cope at work. *Scandinavian Journal of Work, Environment & Health*, 29(2), 134-42. 29: 134–142
- Diem, G., Brownson, R. C., Grabauskas, V., Shatchkute, A., & Stachenko, S. (2015). Prevention and control of noncommunicable diseases through evidence-based public health: implementing the NCD 2020 action plan. *Global Health Promotion*, 23(3), 5–13. <https://doi.org/10.1177/1757975914567513>
- Disease Control Division (2006). Malaysia NCD Surveillance 2006: NCD risk factors in Malaysia. Ministry of Health, Malaysia
- Eng, J. Y., Moy, F. M., & Bulgiba, A. (2016). Impact of a Workplace Health Promotion Program on Employees' Blood Pressure in a Public University. *PLoS ONE*, 11(2), 1–14. <https://doi.org/10.1371/journal.pone.0148307>
- European Chronic Diseases Alliance. (2017). Joint statement on Improving the employment of people with chronic diseases in Europe. Retrieved from: https://ec.europa.eu/health/sites/health/files/policies/docs/2017_chronic_framingdoc_en.pdf.
- Freak-Poli, R., Wolfe, R., & Peeters, A. (2010). Risk of cardiovascular disease and diabetes in a working population with sedentary occupations. *Journal of Occupational and Environmental Medicine*, 52(11), 1132 – 1137. <https://doi.org/10.1097/JOM.0b013e3181f8da77>
- Fiidow, O. A., Huda, B. Z., & Salmiah, M. S. (2016). Socio-demographic Factors of Hypertension among Non-Academic Staff in Universiti Putra Malaysia. *International Journal of Public Health and Clinical Sciences*, 3, 158 –168
- Gawde, N. C., & Kurlikar, P. R. (2016). Chronic disease risk factors among hotel workers. *Indian Journal of Occupational and Environmental Medicine*, 20 (1), 14– 20. <https://doi.org/10.4103/0019-5278.183830>

- Gehlert, S., Sohmer, D., Sacks, T., Mininger, C., McClintock, M., & Olopade, O. (2008). Targeting health disparities: A model linking upstream determinants to downstream interventions. *Health Aff (Millwood)*, 27(2), 339–349. <https://doi.org/10.1377/hlthaff.27.2.339>
- Gilman, S. E., Martin, L. T., Abrams, D. B., Kawachi, I., Kubzansky, L., Loucks, E. B., ... Buka, S. L. (2008). Educational attainment and cigarette smoking: a causal association? *International Journal of Epidemiology*, 37(3), 615–624. <https://doi.org/10.1093/ije/dym250>
- Gochman, D. S. (1997). *Handbook of Health Behavior Research II*, Plenum Press, New York.
- Gregson, J., Foerster, S. B., Orr, R., Jones, L., Benedict, J., Clarke, B., ... Zotz, A. K. (2001). System, environmental, and policy changes: Using the social-ecological model as a framework for evaluating nutrition education and social marketing programs with lowincome audiences. *Journal of Nutrition Education and Behavior*, 33, S4–15. [https://doi.org/10.1016/s1499-4046\(06\)60065-1](https://doi.org/10.1016/s1499-4046(06)60065-1)
- Heitzmann, K., Canagarajah, R.S., Siegel, P.B. (2002). Guidelines for assessing the sources of risk and vulnerability, Social Protection Discussion Papers and Notes 31372, The World Bank
- Hu, D., Taylor, T., Blow, J., & Cooper, T. V. (2011). Multiple health behaviours: Patterns and correlates of diet and exercise in Hispanic college sample. *Eating Behaviors*, 12, 296-301. <https://doi.org/10.1016/j.eatbeh.2011.07.009>
- Hutch, D. J., Bouye, K. E., Skillen, E., Lee, C., Whitehead, L., & Rashid, J. R. (2011). Potential strategies to eliminate built environment disparities for disadvantaged and vulnerable communities. *American Journal of Public Health*, 101,587–595. <https://doi.org/10.2105/AJPH.2009.173872>
- Jain, S., Gupta, S. K., Gupta, S., Jain, V., & Jain, S. (2018). Knowledge of Modifiable Risk Factors of Non Communicable Diseases (NCDS): A Cross Sectional Study from Urban Slum Bhopal. *National Journal of Community Medicine*, 9(6), 443-47
- Kassa, M. D., & Grace, J. (2018). Healthcare Professionals' Perceptions of Non-Communicable Diseases Risk Factors and Its Regional Distribution in Ethiopia. *Global Journal of Health Science*, 10 (1), 88–97. <https://doi.org/10.5539/gjhs.v10n1p88>
- Kataria, I., Ngongo, C., Lim, S. C., Kocher, E., Kowal, P., Chandran, A., ... Mustapha, F. I. (2020) Development and evaluation of a digital, community-based intervention to reduce noncommunicable disease risk in a low-resource urban setting in Malaysia: a research protocol. *Implementation Science Communications*, 7, 87,2–9. <https://doi.org/10.1186/s43058-020-00080-y>
- Khalid, B. A. K., Rani, U., Lian, N.M., Kong, N. C. T., & Razak, T. A. (1990). Prevalence of diabetes, hypertension and renal disease amongst railway workers in Malaysia. *Medical Journal of Malaysia*, 45, 8–13
- Kim, D., Kawachi, I., Hoorn, S. V., & Ezzati, M. (2008). Is inequality at the heart of it? Cross-country associations of income inequality with cardiovascular diseases and risk factors. *Social Science & Medicine*, 66(8),1719–1732. <https://doi.org/10.1016/j.socscimed.2007.12.030>
- Kim, I. G., & So, W. Y. (2014). The relationship between household income and physical activity in Korea. *Journal of Physical Therapy Science*, 26(12), 1887–1889. <https://doi.org/10.1589/jpts.26.1887>

- Kit, L. P., Abu Saad, H., Jamaluddin, R., & Phing, C. H. (2020). Prevalence of Overweight and Obesity among Primary Healthcare Workers in Perak, Malaysia. *IJUM Medical Journal Malaysia*, 19(1), 23-30. <https://doi.org/10.31436/imjm.v19i1.1327>
- Kivimaki, M., Gimeno, D., Ferrie, J. E., Batty, G. D., Oksanen, T., Jokela, M., ... Vahtera, J. (2009). Socioeconomic position, psychosocial work environment and cerebrovascular disease among women: the Finnish public sector study. *International Journal of Epidemiology*, 38, 1265–1271. <https://doi.org/10.1093/ije/dyn373>
- Krishnan, S., Sivaram, S., Anderson, B. O., Basu, P., Belinson, J. L., Bhatla, N., ... Mehrotra, R. (2015) Using implementation science to advance cancer prevention in India. *Asian Pacific Journal of Cancer Prevention*, 16, 3639–3644. <https://doi.org/10.7314/apjcp.2015.16.9.3639>
- Kumanyika, S. K., & Morrissink, C. B. (2006). Bridging domains in efforts to reduce disparities in health and health care. *Health Education & Behavior*, 33, 440–458. <https://doi.org/10.1177/1090198106287730>
- Larsen, P. Chronicity. (2009). In: Lubkin IM, Larsen PD, editors. *Chronic Illness: Impact and Intervention*. (7th ed.) Jones and Bartlett; Boston, MA:3–24
- La Torre, G., Sestili, C., Mannocci, A., Sinopoli, A., De Paolis, M., De Francesco, S., ... De Giusti, M. (2018). Association between work related stress and health related quality of life: The impact of socio-demographic variables. A cross sectional study in a region of central Italy. *International Journal of Environmental Research and Public Health*, 15(1), 2–9. <https://doi.org/10.3390/ijerph15010159>
- Li, C. Y., & Sung, F. C. (1999). A review of the healthy worker effect in occupational epidemiology. *Occupational Medicine*, 49(4):225–229. <https://doi.org/10.1093/occmed/49.4.225>
- Lim, H. M., Chee, H., Kandiah, M., Shamsuddin, K., Jamaluddin, J., Nordin, N., ... Shuib R. (2003). Dietary and other factors associated with overweight among women workers in two electronics factories in Selangor. *Malaysian Journal of Nutrition*, 9(2), 105–24
- Liu, Y. B., Liu, L., Li, Y. F., & Chen, Y. L. (2015). Relationship between Health Literacy, Health-Related Behaviors and Health Status: A Survey of Elderly Chinese. *International Journal of Environmental Research and Public Health*, 12 (8), 9714 – 9725. <https://doi.org/10.3390/ijerph120809714>
- Lorig, K. R., & Holman, H. (2003). Self-management education: history, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine*, 26, 1–7. https://doi.org/10.1207/S15324796ABM2601_01
- Lua, G. W., Moy, F. M., & Atiya, A. (2004). Coronary heart disease risk assessment among the security staff in a public university. *Malaysian Journal of Public Health Medicine*, 4 (1), 29–34
- Mahadevan, M. (2016). Chronic Disease Self Management Behaviors of South Asian Women in an Inner- City Minority Neighborhood. *Journal of Nutrition Education and Behavior*, 48(7). <https://doi.org/10.1016/j.jneb.2016.04.233>
- Martin, A. R., Nieto, J. M., Ruiz, J. P., & Jimenez, L. E. (2008). Overweight and Obesity: The Role of Education, Employment and Income in Spanish Adults. *Appetite*, 51(2), 266-72. <https://doi.org/10.1016/j.appet.2008.02.021>
- McDonald, K. (2003). Tackling chronic diseases: A conversation with Dr. James Marks. http://www.cdcfoundation.org/frontline/2003/tackling_chronic_diseases.aspx.
- McLaren, L. (2007). Socioeconomic status and obesity. *Epidemiologic Reviews*, 29, 29–48. <https://doi.org/10.1093/epirev/mxm001>

- McLeroy, K., Bibeau, D., Steckler, A., & Glanzet, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15 (4), 351–377. doi:10.1177/109019818801500401
- Meyer, J. D. (2014). Race-based job discrimination, disparities in job control, and their joint effects on health. *American Journal of Industrial Medicine*, 57(5), 587–595. <https://doi.org/10.1002/ajim.22255>
- Ministry of Health Malaysia. (2022). Direct Health-care Cost of Non-Communicable Disease in Malaysia (2022). Putrajaya Malaysia.
- Mujahid, M. S., Diez Roux, A. V., Morenoff, J. D., Raghunathan, T. E., Cooper, R. S., Ni, H., ... Shea, S. (2008). Neighborhood characteristics and hypertension. *Epidemiology*, 19(4), 590–598. <https://doi.org/10.1097/EDE.0b013e3181772cb2>
- Mulyati, L., Yetti, K., & Sukmarini, L. (2003). Analisis Faktor yang Memengaruhi Self-Management Behaviour pada Pasien Hipertensi. *Jurnal Keperawatan Padjadjaran*. 1, 112–123
- Muna, A. S., Azmi, M. A. H., & Izham, M. I. (2010). Evaluation of direct medical cost in treating hypertension in a Malaysian public university. *Asian Journal of Pharmaceutical and Clinical Research*, 3, 170–173
- National Health and Morbidity Survey. (2015). *National Health and Morbidity Survey 2015 (NHMS 2015). Vol. II: Non-Communicable Diseases, Risk Factors & Other Health Problems*. Kuala Lumpur: Ministry of Health Malaysia
- Negin, J., Cumming, R., de Ramirez, S. S., Abimbola, S., & Sachs, S. E. (2011). Risk factors for non-communicable diseases among older adults in rural Africa. *Tropical Medicine & International Health*, 16(5), 640–6. <https://doi.org/10.1111/j.1365-3156.2011.02739.x>
- Neira M. (2019). Environmental risks and non-communicable diseases. *BMJ*, 365 (1 Suppl): 17–19. <https://doi.org/10.1136/bmj.l265>
- Qistina, N. A. R., Afiah, N. M. Z., Moideen, A. M., & Rozali, A. (2021). Overweight and Obesity Among the Army Personnel with Low Socio-Economic Status in Kuala Lumpur: A Cross-Sectional Study. *Research Square*, 1–18. <https://doi.org/10.21203/rs.3.rs-307025/v1>
- Noar, S.M., Chabot, M., & Zimmerman, R.S. (2008). Applying health behaviour theory to multiple behaviour change: Considerations and approaches. *Preventive Medicine*, 46 (3), 275–280. <https://doi.org/10.1016/j.ypmed.2007.08.001>
- Oetzel, J.G., Ting-Toomey, S., & Rinderle, S. (2006). *Conflict communication in contexts: A social ecological perspective*. In J. G. Oetzel & S. Ting-Toomey (Eds.), *The SAGE handbook of conflict communication*. 727–739. Thousand Oaks, CA: SAGE
- Pampel, F. C., Krueger, P. M., & Denney, J. T. (2010). Socioeconomic Disparities in Health Behaviors. *Annual Review of Sociology*, 36, 349–370. <https://doi.org/10.1146/annurev.soc.012809.102529>
- Pincus, Y., Esther, R., & DeWalt, D. A., & Callaghan, L. F. (1998). Social conditions and self-management are more powerful determinants of health than access to healthcare. *Annals of Internal Medicine*, 129(5), 406–11. <https://doi.org/10.7326/0003-4819-129-5-199809010-00011>
- Promthet, S., Saranrittichai, K., Kamsa-ard, S., Senarak, W., Vatanasapt, P., & Wiangnon, S. (2011). Situation analysis of risk factors related to non-communicable diseases in Khon Kaen Province, Thailand. *Asian Pacific Journal of Cancer Prevention*, 12 (5), 1337–1340
- Puig- Ribera, A., McKenna, J., Gilson, N., & Brown, W. J. (2008). Change in work day step counts, wellbeing and job performance in Catalan university employees: A randomized

- controlled trial. *Promotion & Education*, 15(4), 11–16. <https://doi.org/10.1177/1025382308097693>
- Rampal, L., Saeedi, P., Bezenjani, S. A., Salmiah, M. S., & Norlijah, O. (2012). Obesity and Associated Health Related Factors Among University Staff in Serdang, Malaysia. *Malaysian Malaysian Journal of Medicine and Health Sciences*, 8 (2), 23–32
- Reddy, S. P., Resnicow, K., James, S., Funani, I. N., Kambaran, N. S., Omarion, R. G., Masuka, P., Sewpaul, R., Vaughan, R. D., & Mbewu, A. (2012). Rapid increases in overweight and obesity among South African adolescents: Comparison of data from the South African national youth risk behaviour survey in 2002 and 2008. *American Journal of Public Health*, 102(2), 262–268. <https://doi.org/10.2105/AJPH.2011.300222>
- Rockefeller Institute. (2013). Health Vulnerabilities of informal workers. Retrieved from: <https://assets.rockefellerfoundation.org/app/uploads/20130528214745/Health-Vulnerabilities-ofInformal-Workers.pdf>
- Ross, C. E., & Wu, C-L. (1995). The links between education and health. *Annual Review of Public Health*, 69, 719 – 745. <https://doi.org/10.2307/2096319>
- Sallis, J. F., Cervero, R. B., Ascher, W., Henderson, K. A., Kraft, M. K., & Kerr, J. (2006). An Ecological Approach to Creating More Physically Active Communities. *Annual Review of Public Health*, 27, 297–322. <https://doi.org/10.1146/annurev.publhealth.27.021405.102100>
- Santiago, C. D., Wadsworth, M. E., & Stump, J. (2011). Socioeconomic status, neighborhood disadvantage, and poverty-related stress: Prospective effects on psychological syndromes among diverse low-income families. *Journal of Economic Psychology*, 32, 218–230. <https://doi.org/10.1016/j.joep.2009.10.008>
- Service, J. (2004). Workplace culture and mental health are interwoven. *Healthcare Papers*, 5(2), 72–75
- Shamsul, A. Z. B., Jayashree, A., & Norhasmah, S. (2013). Food Consumption Patterns of Lower-Income Households in Rural Areas of Peninsular. *Jurnal Pengguna Malaysia*, 21, 141-163
- Sherbourne, C. D., Hays, R. D., Ordway, L., DiMatteo, M. R., & Kravitz, R. L. (1992). Antecedents of adherence to medical recommendations: Results from the Medical Outcomes Study. *Journal of Behavioral Medicine*, 15(5), 447-468. <https://doi.org/10.1007/BF00844941>
- Shimotsu, S. T., French, S. A., Gerlach, A. F., & Hannan, P. J. (2007). Worksite environment physical activity and healthy food choices: Measurement of the worksite food and physical activity environment at four metropolitan bus garages. *International Journal of Behavioral Nutrition and Physical Activity*, 4,1–8. <https://doi.org/10.1186/1479-5868-4-17>
- Silva-Matos, C., & Beran, D. (2012). Noncommunicable diseases in Mozambique: Risk factors, burden, response and outcomes to date. *Globalization and Health*, 8, 37. <https://doi.org/10.1186/1744-8603-8-37>
- Slopen, N., Kontos, E. Z., Ryff, C. D., Ayanian, J. Z., Albert, M. A., & Williams, D. R. (2013). Psychosocial stress and cigarette smoking persistence, cessation, and relapse over 9–10 years: a prospective study of middle-aged adults in the United States. *Cancer Causes Control*, 224(10), 1849–1863. <https://doi.org/10.1007/s10552-013-0262-5>
- Sorensen, G., Barbeau, E., Hunt, M. K., & Emmons, K. (2004). Reducing social disparities in tobacco use: a social contextual model for reducing tobacco use among blue-collar workers. *American Journal of Public Health*, 94(2), 230-9. <https://doi.org/10.2105/ajph.94.2.230>

- Sorensen, M., & Grill, D. L. (2008). Perceived barriers to physical activity across Norwegian adult age groups, gender and stages of change. *Scandinavian Journal of Medicine & Science in Sports*, 18(5), 651–63. <https://doi.org/10.1111/j.1600-0838.2007.00686.x>
- Sorensen, G., Landsbergis, P., Hammer, L., Amick, B. C., Linnan, L., Yancey, A., Welch, L. S., Goetzl, R. Z., Flannery, K. M., Pratt, C. (2011). Preventing chronic disease in the workplace: a workshop report and recommendations. *American Journal of Public Health*, 101(Suppl 1): S196–S207. <https://doi.10.2105/AJPH.2010.300075>
- Stelmach, W., Kaczmarczyk-Chalas, K., Bielecki, W., Stelmach, I., & Drygas W. (2004). How income and education contribute to risk factors for cardiovascular disease in the elderly in a former Communist country. *Public Health*, 118(6), 439–449. <https://doi.org/10.1016/j.puhe.2003.12.012>
- Stewart, M., Brown, J. B., Donner, A., McWhinney, I. R., Oates, J., & Weston, W. W. (2000). The impact of patient-centered care on patient outcomes. *Journal of family practice*, 49(9), 796–804
- Stokols, D. (1992). Establishing and maintaining healthy environments: Toward a social ecology of health promotion. *American Psychologist*, 47(1), 6–22. <https://doi.org/10.1037/0003-066X.47.1.6>
- Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, 10 (4), 282–298. <https://doi.org/10.4278/0890-1171-10.4.282>
- Story, M., Kaphingst, K. M., Robinson-O'brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: policy and environmental approaches. *Annual Review of Public Health*, 29, 253–272. <https://doi.10.1146/annurev.publhealth.29.020907.090926>
- Stringhini, S., Carmeli, C., Jokela, M., Avendano, M., Muennig, P., Guida, F, Ricceri, F., d'Errico, A., Barros, H., Bochud, M., Chadeau-Hyam, M., Clavel-Chapelon, F., Costa, G., Delpierre, C., Fraga, S., Goldberg, M., Giles, G. G., Krogh, V., Kelly-Irving, M., Layte, R., Lasserre, A. M., Marmot, M. G., Preisig, M., Shipley, M. J., Vollenweider, P., Zins, M., Kawachi, I., Steptoe, A., Mackenbach, J. P., Vineis, P., Kivimaki, M., & LIFEPAATH consortium. (2017). Socioeconomic status and the 25× 25 risk factors as determinants of premature mortality: a multicohort study and meta-analysis of 1· 7 million men and women. *Lancet*, 389 (10075), 1229 – 12237. [http://dx.doi.org/10.1016/S0140-6736\(16\)32380-7](http://dx.doi.org/10.1016/S0140-6736(16)32380-7)
- Su, T., Azzani, M., Tan, F. L., Loh, S. Y. (2018). Breast cancer survivors: return to work and wage loss in selected hospitals in Malaysia. *Support Care Cancer*, 26(5), 1617–1624. <https://doi.org/10.1007/s00520-017-3987-y>
- Taylor, D., Bury, M., Campling, N., Carter, S., Garfied, S., Newbould, J., & Rennie, T. A. (2007). *Review of the Use of the Health Belief Model (HBM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Trans-Theoretical Model (TTM) to Study and Predict Health Related Behaviour Change*; Department of Health: London, UK.
- Thakur, J. S., Prinja, S., Garg, C. C., Mendis, S., & Menabde, N. (2011). Social and Economic Implications of Noncommunicable diseases in India. *Indian Journal of Community Medicine*, 36 (Suppl 1), S13–22. <https://doi.10.4103/0970-0218.94704>
- UK Department of Health. (2004). Chronic disease management: A compendium of information. London: Department of Health Publications. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_062820

- Ustun, A. P., Deventer, E. V., Mudu, P., Lendrum, D. C., Vickers, C., Ivanov, I., Forastiere, F., Gummy, S., Dora, C., Adair-Rohani, H.,
- Viswanathan, M., Golin, C. E., Jones, C. D., Ashok, M., Blalock, S. J., Wines, R. C., L Coker-Schwimmer, E. J., Rosen, D. L., Sista, P., & Lohr, K. N. (2012). Interventions to improve adherence to self-administered medications for chronic diseases in the United States: a systematic review. *Annals of Internal Medicine*, 157(11), 785-95. 157, 785–795. <https://doi.org/10.7326/0003-4819-157-11-201212040-00538>
- Wang, E. A., McGinnis, K. A., Goulet, J., Bryant, K., Gibert, C., Leaf, D. A., ... for the Veterans Aging Cohort Study Project Team. (2015). Food insecurity and health: data from the Veterans Aging Cohort Study. *Public Health Reports*, 130(3), 61– 68. <https://doi.org/10.1177/003335491513000313>
- Wilcox, S., Bopp, M., Oberrecht, L., Kammermann, S. K., & McElmurray, C. T. (2003). Psychosocial and perceived environmental correlates of physical activity in rural and older African american and white women. *Journals of Gerontology: Series B*, 58 (6), 329-37. <https://doi.org/10.1093/geronb/58.6.P329>
- Wilkinson, D., & McDougall, R. (2007). Primary trauma care. *Anaesthesia*, 62(1), 61–64. <https://doi.org/10.1111/j.1365-2044.2007.05301.x>
- Wilkinson, A., & Whitehead, L. (2009). Evolution of the concept of self-care and implications for nurses: a literature review. *International Journal of Nursing Studies*, 46, 1143–1147. <https://doi.org/10.1016/j.ijnurstu.2008.12.011>
- Wolf, S. H., Dekker, M. M., Byrne, F. R., & Miller, W. D. (2011). Citizen-centered health promotion: building collaborations to facilitate healthy living. *American Journal of Preventive Medicine*, 40(1), 38–47. <https://doi.org/10.1016/j.amepre.2010.09.025>
- World Health Organization. (2005a). Preventing chronic diseases: a vital investment: WHO global report. Geneva: World Health Organization
- World Health Organization. (2008). Chronic diseases and health promotion. <http://www.who.int/chp/en/>
- World Health Organization. (2012). Country health information profiles: Malaysia Web site. http://www.who.int/gho/countries/mys/country_profiles/en/index.html
- World Health Organization. (2017). Noncommunicable Diseases: Progress Monitor 2017; World Health Organization: Geneva, Switzerland.
- World Health Organization. (2017). Protecting workers' health. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/protecting-workers'-health>.
- World Health Organization. (2017). Noncommunicable Diseases: Progress Monitor 2017; World Health Organization: Geneva, Switzerland. Retrieved from <https://apps.who.int/iris/handle/10665/258940>
- Yusuf, S., Reddy, S., Ounpuu, S., & Anand, S. (2001). Global burden of cardiovascular diseases: part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization. *Circulation*, 104(22)