**QUEEN'S
UNIVERSITY
BELFAST**

Seeking medical help for cancer among urban dwellers in Malaysia—Emotional barriers and awareness of cancer symptoms

Su, T. T., Azzani, M., Donnelly, M., & Majid, H. A. (2020). Seeking medical help for cancer among urban dwellers in Malaysia—Emotional barriers and awareness of cancer symptoms. *European Journal of Cancer Care*, [e13232]. <https://doi.org/10.1111/ecc.13232>

Published in:
European Journal of Cancer Care

Document Version:
Peer reviewed version

Queen's University Belfast - Research Portal:
[Link to publication record in Queen's University Belfast Research Portal](#)

Publisher rights

© 2020 John Wiley & Sons Ltd. This work is made available online in accordance with the publisher's policies. Please refer to any applicable terms of use of the publisher.

General rights

Copyright for the publications made accessible via the Queen's University Belfast Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The Research Portal is Queen's institutional repository that provides access to Queen's research output. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact openaccess@qub.ac.uk.

**Seeking medical help for cancer among urban dwellers in Malaysia – emotional barriers
and awareness of cancer symptoms**

ABSTRACT

OBJECTIVES: The main aims of the study were to identify barriers to seeking help for cancer, appraise demographic and socio-economic differences in relation to barriers and evaluate the association between barriers and cancer symptoms awareness and delayed help-seeking.

METHODS: A total of 2,360 adults from randomly selected households in metropolitan Kuala Lumpur completed face-to-face interviews with trained research assistants that incorporated the validated Malay version of the Cancer Awareness Measure (CAM). Logistic regression was the main statistical techniques that was used to investigate the study objectives and relationships (noted above).

RESULTS: The most commonly reported barriers to help-seeking were emotional barriers. The probability of delaying seeking help was 49% higher in participants who reported emotional barriers (OR = 1.49; CI: 1.32 – 1.68); and each unit rise in the cancer symptom awareness score was associated with a reduced likelihood of 29% in help-seeking delay (OR= 0.71; 95% CI: 0.68 – 0.74).

CONCLUSIONS: Our study presents clear evidence of the relationship between cancer awareness and help-seeking; and the need for, and potential positive impact of, providing cancer awareness raising programs.

. Cancer health education campaigns or programme should address emotional barriers and encourage early seeking help.

KEYWORDS: cancer awareness; barriers to seeking medical help; anticipated delay in help-seeking; Malaysia

BACKGROUND

Cancer is one of the principal causes of death worldwide. GLOBOCAN 2018 estimated that there will be 18.1 million new cases and 9.6 million cancer deaths worldwide in 2018 (Bray et al., 2018). In South-East Asia, the age standardized mortality rate per 100,000 was 114.1 and 79.5 for males and females, respectively (Torre et al., 2015). According to the latest National Cancer Report in Malaysia (2007), the age standardized incidence rate was 86.9 per 100,000 males and 99.3 per 100,000 females; the majority of cases (57.7%) presented at an advanced stage (Omar & Tamin, 2011). The mortality rate of non-communicable diseases including cancer is expected to increase by 15% globally between 2010 and 2020. ("World Health Organization - Burden: mortality, morbidity and risk factors," 2012).

Lack of awareness about cancer signs and symptoms is one of the reasons for presentation of cancer at advanced stages. For example, findings from a study conducted in the UK showed that people who delayed seeking help for suspected cancer tended to be unaware of cancer symptoms (Forbes, Warburton, Richards, & Ramirez, 2014; Macleod, Mitchell, Burgess, MacDonald, & Ramirez, 2009). In addition, individuals who reported barriers tended to ~~anticipated~~ delay medical help seeking (Robb et al., 2009; Simon, Waller, Robb, & Wardle, 2010). Perceived barriers to seeking help appear to vary between countries (Forbes et al., 2013). For instance, being 'worried about wasting the doctor's time' was perceived to be a barrier to making an appointment to see a doctor about a symptom for 34% of UK participants, 21% of Canadians and 9% of Swedes (Forbes et al., 2013). Low awareness of cancer warning signs and more barriers to medical help seeking impacts negatively on diagnosis and treatment outcomes through delaying symptomatic

presentation (Niksic et al., 2015). A lower level of awareness about cancer symptoms and a higher number of barriers in relation to symptom presentation tends to be reported by low (compared to high) socio-economic groups (Robb et al., 2009) (Brunswick, Wardle, & Jarvis, 2001), and older (compared to younger) people (Linsell, Burgess, & Ramirez, 2008). These variables (socio-economic status and age) may help to explain the advanced stage of cancer at time of diagnosis and the lower survival rate for people who present late to their doctor (Lyratzopoulos et al., 2012; Rachet et al., 2010).

There is no population-based cancer screening in Malaysia. Most cancer cases are diagnosed through presentation of symptoms rather than regular screening. Key knowledge gaps in this area in Malaysia include barriers and delays to help seeking for cancer and cancer symptom awareness. In addition, an analysis of socio-demographic variables and their potential influence regarding barriers to seeking help for cancer is likely to contribute further to improved understanding and the development of effective cancer health education policies and programmes that promote early help seeking and increase cancer survival. This is the first study in Malaysia to identify barriers to seeking help for cancer, investigate the role of sociodemographic and socio-economic factors in relation to barriers and evaluate the relationship between barriers, cancer symptom awareness ~~anticipated~~ and delay in help-seeking.

METHODS

Design Setting and Data Collection

A cross-sectional survey was conducted in 2012 in four Community Housing Projects (PPRs: Projek Perumahan Rakyat) located in Lembah Pantai area in metropolitan Kuala Lumpur, Malaysia¹. We obtained a list of PPRs (n=6) in the study area from the City Hall, Kuala Lumpur and selected four PPRs randomly. A list of households in each selected PPR was provided by the PPR management committee. The compiled lists of households from the four PPRs summed to a total number of 4728 households. Each household was tagged with a serial number to create a sampling frame and then 833/4728 households were selected by using a computer generated random numbers table. All adults (aged ≥ 18 years) from each selected household were invited to answer the interview including the validated cancer awareness measure (CAM) questionnaire (n=xxxx). Written consent was obtained from xxxx participants.

Sample Size

The required sample size of 384 was estimated using the OpenEpi online program (Sullivan, Dean, & Soe, 2009) and calculated based on the following parameters: an urban population in Kuala Lumpur of five million adults, 50% of whom may be expected to experience barriers and delay seeking health care for cancer ($\pm 5\%$ of confidence limits) with a power of 80% and 95%

¹ These housings were allocated to residents who (i) are married and have at least one child; (ii) have household head's monthly salary of not more than MYR 2,000 (about 526 USD in year 2000); and (iii) do not have a property within the circumference of 35 kilometer from the metropolitan Kuala Lumpur

confidence intervals. In practice, we included all eligible participants in each household who consented to be interviewed (n=2360).

Survey instrument and variables

We conducted this study using the validated Malay version of the Cancer Awareness Measure (CAM). The original CAM questionnaire was developed by Cancer Research UK-funded university researchers (CAM toolkit (version 2), 2008). The CAM assesses awareness and knowledge about cancer warning signs, help-seeking barriers and time taken to consult a doctor. The CAM questionnaire was translated into the local and official language of Malaysia (Bahasa Melayu). Forward and backward translation was performed by independent bi-lingual individuals. We conducted a face validity study (n=30) before the beginning of the main survey to evaluate the extent to which the questionnaire was clear, simple and easy to understand, the presence of any inappropriate, redundant, incorrectly worded or missing items and the relevancy, flow and arrangement of the questionnaire. Generally, the validity study indicated that the CAM questionnaire was culturally acceptable to the Malaysian population. Only minor amendments were made, for example, the “anticipated delay question” was changed to an open-ended question as suggested by the validity study participants. A Cronbach’s α of 0.95 was calculated for the Malay CAM indicating that it had a high level of internal reliability. Face-to-face interviews were undertaken by trained interviewers in the face validity study and the main survey.

Help seeking barriers. Questions about barriers to help-seeking included: ‘I would be...too embarrassed...too scared...[and]...worried about what the doctor will find’ (emotional barrier domain); ‘Difficult to...talk to the doctor...make an appointment with the doctor...[and]...worried

about wasting doctor's time' (service barrier domain); and 'Too many things to worry about', 'Difficult to arrange transport to the clinic' and 'Too busy' (practical barrier domain). Response options ('Yes' (1 point), 'No' (0 points) and 'Don't know' (0 points)) were analyzed in terms of an individual item score, a 3-item domain score and a total score. Item scores were summed and averaged for each domain and the three domain scores were summed to give a total score and average score.

Anticipated delay. Help seeking was assessed using this open question: 'If you had a symptom that you thought might be a sign of cancer, how soon would you contact a doctor to make an appointment to discuss it?' Responses of more than 2-weeks were categorized as 'delayed' and responses of less than 2-weeks were denoted, 'not delayed'.

Awareness of warning signs and symptoms. The CAM measure was described above. In brief, an open-ended (recall) question asked respondents: 'There are many warning signs and symptoms of cancer. Please name as many as you can think of'. Closed (recognition) questions were posed about specific warning signs of cancer: 'The following may or may not be a warning sign for cancer. We are interested in your opinion'. Nine cancer signs were listed: unexplained lump or swelling, unexplained pain, unexplained bleeding, persistent cough or hoarseness, persistent change in bowel or bladder habits, difficulty swallowing, change in the appearance of a mole, a sore that does not heal, and unexplained weight loss. The recall question and the recognition questions respectively were scored by awarding one point for each 'correct' answer and then summing and averaging answers to produce a separate score for recall and recognition ('No' or 'don't know' were scored as zero).

Demographic and socioeconomic variables

The socio-demographic variables included age (in years), gender, marital status (single, married, divorced and widow/widower) and ethnic/race (Malay, Indian and Chinese/others) — the last two groups were combined in the analysis because of the small number of observations. Socioeconomic status (SES) variables were monthly income, highest education obtained and occupational status. The classifications for income levels were below 1,000 RM; 1,000–1,999 RM; 2,000–2,999 RM; and above 3,000 RM. The median monthly household income in urban Malaysia at the time of the survey was RM 1680 ("How much do Malaysians Earn?", February 2015). Education was categorized as none (no official education); primary (1–6 years); secondary (7–12 years); and, tertiary (above 13 years). Finally, occupational status was grouped as paid-employee, self-employed, retired, home maker, and others (Department of Statistics Malaysia, 2013; The HLS-EU Consortium, 2012). Additional categories included students, trainees and apprentices.

Statistical analysis

Chi square analysis was conducted to test the association between demographic and socioeconomic factors in relation to different types of barriers. In addition, binary logistic regression was used to analyse barriers to seeking care and factors associated with anticipated delay in help-seeking. The power of the logit model was calculated by using an online post-hoc statistical power calculator (give online ref). The power of the final logit model was 1, which means the model is adequate with a probability level of 0.05. Data analysis was undertaken using SPSS software version 22.

Ethical approval

The study protocol and procedures were approved by the University Malaya Medical Centre (UMMC) Ethical Committee (MEC Ref No. 890.161). Informed consent was obtained from all study participants.

RESULTS

The majority of the respondents were females (52.9%), relatively young adults (25 to 44 years), Malays (82.1%), married (56.7%), and had secondary education (64.9%). Approximately 18% of the sample earned less than MYR1000 per month (see Table 1). The response rate was 50.5%.

Help-seeking barriers

Emotional barriers were the highest endorsed type of barriers to seeking a consultation with a doctor. For instance, 26.5% of respondents claimed that they would be *'Too Scared'* and 21.7% would be *'Worried about What Doctors Will Find.'* The main type of service barrier (10%) was *'Difficulty Making an Appointment'* and the main practical barrier (14.7%) was *'Too Busy'* (see Figure 1 & Table 2). One or more emotional barriers were the most frequently stated obstacles to seeking medical consultation.

Figure 1 Barriers to seeking care (n= 2360)

Respondents' demographic and socioeconomic characteristics in relation to barriers to seeking help are presented in Table 3.

Table 3: The relationship between demographic and socio-economic factors and different domains/types of barriers (n = 2360)

Females were significantly more likely to report an emotional barrier to seeking care (OR=1.384, 95% CI: 1.135-1.686). There was no gender difference for practical barriers or service barriers. Compared to older participants (≥ 65), younger participants reported more often emotional and practical barriers to seeking medical help. Ethnic group status was associated with the reporting of barriers, where, for example, Indians reported significantly more frequently than Malays all types of barriers ($p < 0.05$). Single, unmarried or non-cohabiting participants were least likely to report an emotional barrier; and single and married people were less likely to encounter a practical barrier compared to widowed and divorced participants. Participants who had an income of RM 1000-2999 reported emotional barriers more frequently than people in other income groups (Table 4).

Table 4 Logistic regression analysis of barriers to seeking care

Delay in seeking help

One quarter (2360/589; 25%) reported that they would delay seeking care in the face of experiencing symptoms. The mean cancer symptoms awareness scores for ‘recognition’ and ‘recall’ were 0.40 (SD= 0.68, min. 0 max. 6) and 3.96 (SD= 3.06, min. 0 max. 9), respectively. Table 5 presents the results of a logistic regression of reported delay adjusted for demographic and socio-economic variables. Each unit rise in the score for cancer symptom awareness (recognition) was associated with a reduction by 29% in the likelihood that a participant would delay help-seeking ~~anticipate~~ (OR= 0.71; 95% CI: 0.68 – 0.74). In addition, an increment in the domain score

for emotional barriers increased the likelihood of ~~anticipated~~ reporting delay in seeking a medical consultation by 49% (OR = 1.49; CI: 1.32 – 1.68).

Table 5 Logistic regression analysis of delay in help-seeking

DISCUSSION

The findings highlighted that one out of four Malaysians would delay seeking medical help for suspected cancer symptoms; and that more barriers to help seeking were experienced by women (vs men), younger people (vs older age groups), Indians (vs other ethnic groups), married people (vs divorced and widowed) and low income groups. In particular, women in our study reported more emotional barriers to seeking health care thereby increasing their risk of receiving a delayed or late diagnosis which is similar to findings by other studies (Robb et al., 2009; Niksic et al., 2015; Al-Azri et al., 2016). Fear of embarrassment (the feeling that symptoms were trivial or that symptoms affected a sensitive body area) or fear of the consequent diagnosis and treatment (pain, suffering, and death) were the commonest barriers. Similar again to studies in other countries, women in our study felt worried and embarrassed at the thought of discovering cancer symptoms and were anxious about potential treatments (surgery, chemotherapy) or they thought that there was no cure for cancer (Niksic et al., 2015; Al-Azri et al., 2016). These findings point, perhaps, to the apparent universal nature of emotional differences between men and women and the need for cancer education and health promotion programs to give particular attention to addressing women's concerns about help seeking. There was no significant gender difference regarding practical barriers and service barriers.

The results indicated that older people in the study compared to younger people were least concerned about barriers of any kind and this result is consistent with the finding from research that included 18 cross-sectional surveys across England (Niksic et al., 2015) and yet contrasted with another though smaller English (London) study which found that women aged 65 years and more were more likely to report emotional barrier than younger women (Ferlay et al., 2010). Generally, it is reassuring if, indeed, it is the case that older people are less likely to perceive barriers to visiting a doctor when they notice symptoms given the higher risk of cancer in older age groups.

The ethnicity of our study participants was associated with perceived barriers to help seeking. In particular, Indians reported barriers (of all types) significantly more frequently than Malays. This result was in agreement with findings from UK studies and, collectively, they might be interpreted to suggest a need for the development and implementation of culturally appropriate health education policies and programmes designed to reduce the barriers that are faced by each ethnic group (Robb et al., 2010; Waller et al., 2009). Our findings showed that married participants were more likely to report emotional and service barriers than ‘singles’ which may be related to the socio-demographic profile of the sample and the higher proportion of women participants though the results of our study are in contrast to the findings from a UK study (Niksic et al., 2015). In addition, we found that emotional barriers were reported more often by participants from lower income groups (RM 1000-1999) which may be related to a need for improved health literacy. Emotional barriers appear to be common among socially disadvantaged people – for example, they may be worried and frightened of the possible financial burden following a cancer diagnosis.

However, the lowest income group in our sample (compared to high income participants) were less likely to report practical barriers. It is possible that high income individuals have more job or business commitments or work-life juggling to the extent that it is difficult to find time to visit a doctor (Hvidberga, Wulff, Pedersen, & Vedsted, 2015).

Reported expected delay in help seeking was significantly related with recognition of cancer warning signs and emotional barriers. High recognition of cancer symptoms was strongly associated with a lower likelihood of delay in help seeking behaviour. There was no significant association between reported delay and recall (rather than recognition) of cancer warning signs similar to a CAM study in England (Waller et al., 2009). The results of our study point to importance of cancer awareness and the potential positive impact of providing cancer awareness raising programs.

The major obstacles to delaying seeking help among our respondents were emotional barriers. Presence of at least one emotional barrier raised the probability of a predicted delay (Loo et al., 2013; Simon et al., 2010; Waller et al., 2009). Previous studies in Spain (Lostao, Joiner, Pettit, Chorot, & Sandin, 2001) and the UK (Waller et al., 2009) also found that fear and worry about the results of tests were emotional barriers that stopped people from consulting their doctor. Being *'too scared'* was the most mentioned emotional barrier in our study followed by *'worried what doctor will find'*. Previous studies found that emotional type barriers are the toughest barriers to overcome before seeking help from a health professional (Lostao et al., 2001; Waller et al., 2009); and that lack of confidence to judge whether or not a symptom needs medical attention may underlie emotional barriers and delay (Robb et al. and Waller et al.). A study in rural Malaysia

found a significant positive correlation between knowledge of warning signs and level confidence in judging whether or not to seek medical advice (Su et al., 2013).

Strengths and limitations

This is the first population-based study of cancer symptom awareness and barriers to delays in help seeking for cancer in Malaysia. The large sample size of participants (albeit with a modest response rate of circa 50% and potential response bias) that was selected randomly enabled the identification and quantification of variation regarding key variables in relation to help seeking barriers as well as statistical control for potential confounders. We used a validated tool to measure cancer awareness which facilitated international comparisons. The study was conducted in metropolitan Kuala Lumpur. Thus, our findings may not generalize to rural residents.

Implications

Focusing on early detection and diagnosis in order to save lives is a guiding principle of the Malaysian National Cancer Council (MAKNA) and national plans for cancer. Our findings are in keeping with the rationale for policy plans and health education campaigns that aim to encourage early symptom presentation, early cancer diagnosis and down staging of cancer including the targeting of the needs of specific population groups in relation, for example, to socio-demographic differences that are associated with particular help seeking barriers. There is a need to target cancer awareness raising programs and campaigns towards women in ways that alleviate fears and embarrassment related to seeking help; and consideration should be given to conveying health education messages in local languages such as ‘Tamil’ and ‘Mandarin’ in order to ‘reach’ ethnic

minorities in Malaysia. Overall, the findings point to ways to improve existing health education programs and campaigns and contribute to the important goal of affecting late presentation of cancer and improving cancer survival in Malaysia.

REFERENCES

- Brunswick N, Wardle J, & Jarvis MJ. (2001). Public awareness of warning signs for cancer in Britain. *Cancer Causes Control*, 12(1), 33-37.
- Cancer awareness measure (CAM) toolkit (version 2). (2008). Retrieved 23 September, 2016, from <http://www.cancerresearchuk.org/health-professional/prevention-and-awareness/the-cancer-awareness-measures-cam>
- Department of Statistics Malaysia. (2013). Codes & Classifications. Retrieved 01.08.2013, from http://www.statistics.gov.my/portal/index.php?option=com_content&view=article&id=1492&Itemid=99&lang=en
- Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, & et al. (2012). GLOBOCAN. Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]. France: International Agency for Research on Cancer.
- Ferlay J, Shin HR, Bray F, Forman D, Mathers C, & Parkin, DM. (2010). Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *Int J Cancer*, 127(12), 2893-2917. doi: 10.1002/ijc.25516
- Forbes L, Simon A, Warburton F, Boniface D, Brain K, Dessaix A, Lagerlund M. (2013). Differences in cancer awareness and beliefs between Australia, Canada, Denmark, Norway, Sweden and the UK (the International Cancer Benchmarking Partnership): do they contribute to differences in cancer survival. *Br J Cancer*, 108, 292–300.
- Forbes LJL, Warburton F, Richards MA, & Ramirez AJ. (2014). Risk factors for delay in symptomatic presentation: a survey of cancer patients. *Br J Cancer*(1-8).
- Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, & Jemal A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*, 68(16), 394-424.
- How much do Malaysians Earn? . (February 2015). Retrieved 28 July, 2017, from http://www.krinstitute.org/February_2015-@-How_much_do_Malaysians_Earn.aspx
- Hvidberga L, Wulff CN, Pedersena AF, & Vedsteda P. (2015). Barriers to healthcare seeking, beliefs about cancer and the role of socio-economic position. A Danish population-based study. *Preventive Medicine*, 71, 107–113.
- Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, & Jemal A. (2015). Global cancer statistics, 2012. *CA: a cancer journal for clinicians*, 75(2), 87–108.

- Linsell L, Burgess CC, & Ramirez AJ. (2008). Breast cancer awareness among older women. *Br J Cancer*, 99, 1221–1225.
- Loo JL, Woo WY, Chin MW, Yam HR, Ang YK, & Yim HS. (2013). Cancer Awareness of a Sample of Malaysian Undergraduate Students. *American Journal of Cancer Prevention*, 1(1), 9-13.
- Lostao L, Joiner TE, Pettit JW, Chorot P, & Sandin B. (2001). Health beliefs and illness attitudes as predictors of breast cancer screening attendance. *European Journal of Public Health*, 11(3), 274-279. doi: DOI 10.1093/eurpub/11.3.274
- Lyratzopoulos G, Abel GA, Brown CH, Rous BA, Vernon SA, Roland M, & Greenberg DC. (2012). Socio-demographic inequalities in stage of cancer diagnosis: evidence from patients with female breast, lung, colon, rectal, prostate, renal, bladder, melanoma, ovarian and endometrial cancer. *Ann Oncol*, 24(3), 843–850.
- Niksic M, Rachet B, Warburton FG, Wardle J, Ramirez AJ, & Forbes LJL. (2015). Cancer symptom awareness and barriers to symptomatic presentation in England—are we clear on cancer? *Br J Cancer*, 113(3), 533–542.
- Macleod U, Mitchell ED, Burgess C, MacDonald S, & Ramirez AJ. (2009). Risk factors for delayed presentation and referral of symptomatic cancer: evidence for common cancers. *Br J Cancer*, 101, s92–s101.
- Al-Azri M, Al-Maskari A, Al-Matroushi S, Al-Awisi H, Davidson R, & et al. (2016). Awareness of Cancer Symptoms and Barriers to Seeking Medical Help Among Adult People Attending Primary Care Settings in Oman. *Health Services Research and Managerial Epidemiology*, 3, 1-10.
- Omar ZA, & Tamin NSA. (2011). National cancer registry Report (NCR)2007. Kuala Lumpur: Ministry of Health, Malaysia.
- Post Hoc statistical power calculator. Retrieved 2 February, 2018, from <http://www.danielsoper.com/statcalc/calculator.aspx?id=9>
- Rachet B, Ellis L, Maringe C, Chu T, Nur U, Quaresma M, Forman D. (2010). Socioeconomic inequalities in cancer survival in England after the NHS cancer plan. *Br J Cancer*, 103(4), 446–453.
- Robb K, Stubbings S, Ramirez A, Macleod U, Austoker J, Waller J, Wardle J. (2009). Public awareness of cancer in Britain: a population-based survey of adults. *Br J Cancer*, 101(2), S18–S23.

- Robb K, Wardle J, Stubbings S, Ramirez A, Austoker J, Macleod U, Waller J. (2010). Ethnic disparities in knowledge of cancer screening programmes in the UK. *J Med Screen*, 17(3), 125-131. doi: 10.1258/jms.2010.009112
- Simon AE, Waller J, Robb K, & Wardle J. (2010). Patient delay in presentation of possible cancer symptoms: the contribution of knowledge and attitudes in a population sample from the United kingdom. *Cancer Epidemiol Biomarkers Prev*, 19(9), 2272-2277. doi: 10.1158/1055-9965.EPI-10-0219
- Su TT, Goh JY, Tan J, Muhaimah AR, Pigeneswaren Y, Khairun NS, Majid HA. (2013). Level of colorectal cancer awareness: a cross sectional exploratory study among multi-ethnic rural population in Malaysia. *BMC Cancer*, 13, 376. doi: 10.1186/1471-2407-13-376
- Sullivan KM, Dean A, & Soe MM. (2009). OpenEpi: a web-based epidemiologic and statistical calculator for public health. *Public health reports*, 124(3), 471-474.
- The HLS-EU Consortium. (2012). Final report Executive summary (D17) *The European Health Literacy Project (HLS-EU)*.
<http://www.maastrichtuniversity.nl/web/file?uuid=b994bc0b-bf89-477c-af47-125cfbea4666&owner=5113a977-24b4-40c8-96e3-4b38cf5e99f5>.
- Waller J, Robb K, Stubbings S, Ramirez A, Macleod U, Austoker J, Wardle J. (2009). Awareness of cancer symptoms and anticipated help seeking among ethnic minority groups in England. *Br J Cancer*, 101 Suppl 2, S24-30. doi: 10.1038/sj.bjc.6605387
- World Health Organization - Burden: mortality, morbidity and risk factors,". (2012). from https://www.who.int/nmh/publications/ncd_report_chapter1.pdf