

RESEARCH ARTICLE

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Nutritional Related Knowledge of Cancer Prevention among Primary Health Care Physicians

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Abstract

Objectives: To explore the cancer prevention-related nutrition knowledge of primary health care physicians towards nutrition and its relation to the development of cancer. **Materials and methods:** a cross-sectional study was conducted among family physicians in Riyadh, between November 2019 and April 2020. The participants in the current study were surveyed using a self-administered questionnaire. The questionnaire included socio-economic data and data related to the association between nutrition and cancer. **Results:** The mean correct knowledge score for physicians is good but less than expected (26.5+5.8) 73.6%. Multiple regression revealed that age, position, and nationality to be significantly associated with knowledge of cancer prevention ($P<0.05$) among physicians. **Conclusions:** Primary care physicians have good knowledge about the relation between nutrition and cancer but not sufficient, they should have continuous nutrition educational training programs to ensure safe and sound nutritional advice to patients and for the public about the relation of nutrition and cancer.

Keywords: Cancer prevention- knowledge- nutrition- primary care physicians

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Introduction

Nutritional status and healthy lifestyle are important factors not only in cancer etiology but also in prevention of cancer. Good nutritional status of persons is one of the important factors in living a healthy life with high economic, social and cultural level (Can et al., 2008). Diet may account for about 35% of cancer cases. Accordingly, obesity is associated with an increased risk of endometrial and postmenopausal breast cancers. Less clear is the relationship with colorectal and prostate cancer (Schmandt et al., 2011). The relation between cancer and nutritional status has some differences from region to region, and from country to country (Key et al., 2004).

About 30–40 percent of all cancers can be prevented by adopting a proper lifestyle and dietary measures. Obesity, sugars and refined flour products that contribute to impaired glucose metabolism (which leads to diabetes), low fiber intake, consumption of red meat, and imbalance of omega 3 and omega 6 fats all contribute to excess cancer risk (Chakraborty et al., 2020).

Most of nutritional traditions, behaviors and, health

lifestyle can be gained at age group of children and adolescence (Michels 2005; Vingeliene et al., 2017; Story et al., 2002). One of the most important messages of modern nutrition research is that a diet rich in fruits and vegetables protects against cancer (Donaldson 2004). The study of Willett (2010) revealed a statistically significant protective effect of fruits and vegetables against cancer in 128 studies out of 156 (Willett, 2010). Even in lung and breast cancer, after accounting for smoking, increasing fruits and vegetables reduces the incidence of the disease lung cancer; an additional 20 to 33 percent reduction in lung cancers is estimated (Shams-White et al., 2019; Xiao et al., 2019; Bail et al., 2016; Yang et al., 2015). Hawrysz et al., (2016) reported that a higher level of nutritional knowledge was associated with a higher quality of a pro-healthy diet and lower risk of breast cancer in women or lung cancer in men. In contrast, a lower level of nutritional knowledge was associated with a lower diet quality and a higher risk of both types of cancers. Although there are large knowledge gaps between diet and liver cancer risk, current epidemiological evidence supports an important role of diet in liver cancer development. Heavy alcohol

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drinking and possibly dairy product (not including yogurt) intake increase, while intake of fish, coffee and tea, light-to-moderate alcohol drinking and several healthy dietary patterns may decrease the risk of liver cancer (Yang et al., 2020). Most of the studies have focused on the knowledge level of primary health physicians and nutrition in general, a little was known about their knowledge of nutrition and cancer.

The aim of the current study is to investigate the knowledge of primary health care physicians towards nutrition and its relation with development of cancer.

Materials and Methods

It was a cross-sectional study, conducted amongst primary health care physicians in different government hospitals in Riyadh, Saudi Arabia, (King Saud University Medical City, King Saud Medical City, King Fahad Medical City, Prince Mohammed bin Abdulaziz Hospital, King Faisal Specialist Hospital and Research Centre, Imam Abdulrahman Al-Faisal Hospital, King Salman Hospital and Durmah Hospital), and primary health care centers.

A questionnaire interview was designed to collect data from all physicians in the mentioned hospitals, they were contacted personally to participate in the study. The questionnaire included socio-economic data, questions related to knowledge of participants about the association between nutrition and cancer. Correct answers were given 2, wrong answers were given 1 and don't know 0. The questionnaire was formulated based on literature review and pilot study has been conducted over 20 participants to test its feasibility and reliability. Cronbach's alpha was 0.72.

Data was analyzed using SPSS Pc+ version 21.0 statistical software. Descriptive statistics (mean, standard deviation, frequencies and percentages) were used to

Table 1. Knowledge Statements' Answers among Physicians

| | Correct | Wrong | Do not Know |
|------------------------|-------------|-------------|-------------|
| Excess Body Weight | 263 (72.5%) | 57 (15.7%) | 43 (11.8%) |
| Physical Inactivity | 231 (63.6%) | 63 (17.4%) | 69 (19.0%) |
| High-Fat Density Food | 283 (78.0%) | 36 (9.9%) | 42 (11.6%) |
| Red Meat | 230 (63.4%) | 68 (18.7%) | 65 (17.9%) |
| Canned Foods | 265 (73.0%) | 40 (11.0%) | 58 (16.0%) |
| High Sugar Drinks/Food | 227 (62.5%) | 54 (14.9%) | 82 (22.6%) |
| Alcohol Intake | 310 (85.4%) | 25 (6.9%) | 27 (7.4%) |
| Seafood | 251 (69.1%) | 47 (12.9%) | 63 (17.4%) |
| Green Tea | 255 (70.2%) | 23 (6.3%) | 85 (23.4%) |
| Fruits And Vegetables | 334 (92.0%) | 16 (4.4%) | 13 (3.6%) |
| Processed Meat | 215 (59.2%) | 53 (14.6%) | 95 (26.2%) |
| Food Rich In Fibers | 318 (87.6%) | 27 (7.4%) | 18 (5.0%) |
| Salty Food | 223 (61.4%) | 55 (15.2%) | 85 (23.4%) |
| Organic Food | 233 (64.2%) | 46 (12.7%) | 84 (23.1%) |
| Starchy Food | 121 (33.3%) | 90 (24.8%) | 151 (41.6%) |
| VITAMIN C And E | 213 (58.7%) | 57 (15.7%) | 93 (25.6%) |
| Vitamin B12 | 173 (47.7%) | 68 (18.7%) | 122 (33.6%) |
| Contraceptive Pills | 195 (53.7%) | 102 (28.1%) | 66 (18.2%) |

describe the quantitative and categorical variables. Chi-square test was used to observe the association between categorical study and outcome variables. Variables' means were tested across knowledge score using t test and Anova. A p-value of <0.05 was used to report the statistical significance of estimates. Multiple regression was used to explore the most significant variables that could be associated with the level of knowledge.

The study was approved by Institutional Review Board (IRB) of the college of medicine at King Saud University (E-19-4431).

Results

Out of 450 physicians invited to participate in the study, 363(80%) accepted and returned the survey. Physicians' age ranged from 24-63 years, Two thirds of the physicians (65.6%) were males. As for physicians' position, 238(65.6%) were residents, 85 (23.4 %) were registrar and senior registrar, while consultants constituted 11% of the physicians sample. Two thirds of the physicians were Saudi 238 (65.6 %).

Knowledge statements among physicians

Physicians have good knowledge about nutrition and cancer, the mean correct knowledge score for physicians is (26.5+5.8), 73.6%.

Table 1 illustrates the distribution of knowledge statements among physicians, The items attained the higher correct scores were alcohol intake (85.4%), fruits and vegetables (92%), food rich in fibers(87.6%), high fat density food (78%), Excess body weight(72.5%), and canned food (73%). Statements related to vitamin E, vitamin B12 and contraceptive pills were identified correctly by 15.7%, 18.7%, and 28.1% respectively.

Non-Saudi and consultants have a higher and significant mean knowledge score in comparison to Saudi registrars and residents, Table 2.

The percentage of physicians who advised their patients about the importance of nutrition and cancer constituted a similar percentage as those who mentioned that they do some time and not regularly (43.1%).

Table 2. Comparison of the Physicians' Mean Knowledge Score Across Different Variables

| Variable | Mean+ SD | t-test | F-test | P value |
|------------------|-----------|--------|--------|---------|
| Gender | | | | |
| Male | 26.5+ 5.9 | 0.01 | | 0.99 |
| Female | 26.5+5.5 | | | |
| Nationality | | | | |
| Saudi | 25.4+6.1 | 8.6 | | 0 |
| Non-Saudi | 28.4+4.6 | | | |
| Position: | | | | |
| Consultant | 29.1+4.3 | | | |
| Senior registrar | 27.6+6.3 | | 5.1 | 0.002 |
| Registrar | 27.4+4.3 | | | |
| Resident | 25.7+6.1 | | | |

Table 3. Determinants to Knowledge among Physicians (Multiple Regression Output)

| Model | Standardized Coefficients | t | P value |
|---------------------|---------------------------|-------|---------|
| B | | | |
| Constant | | 6.091 | 0 |
| Age | 0.377 | 2.216 | 0.027 |
| Gender | 0.268 | 1.632 | 0.104 |
| Years Of Experience | 0.051 | 0.966 | 0.335 |
| Postion | 0.147 | 2.491 | 0.013 |
| Nationalty | 0.169 | 2.64 | 0.009 |

Determinants to knowledge among physicians

Multiple regression revealed that, age, position and nationality to be significantly associated with knowledge of cancer prevention (P<0.05) among physicians. (Table 3)

Discussion

Nutrition has long been suspected to play an important role in cancer etiology. The biologic properties of nutrients make them prime candidates to aid in cancer prevention especially when talking about foods rich in antioxidants.

Physicians in the current study had good knowledge but less than expected. A study in Bahrain supported our results, yet the study was addressing the nutritional knowledge in general (Al-Madani et al., 2004).

Physicians in our study recognized the effect of red meat, canned food, fruits and vegetables, processed meat and green tea on cancer. Almost all they believe that “fruits and vegetables” have preventive effects on cancer. Two different studies in Jeddah and Qatar showed that most of primary care physicians believed in its preventive effect (Al-Zahrani and Al-Raddadi 2009; Daradkeh et al., 2012). The result of Kirbiyek and Ozkan (2018) revealed that the association between clinical nutrition education and higher knowledge scores in medical oncologists is significant but indicated a mis-match between knowledge and awareness and what happens in clinical practice.

A meta-analysis revealed that high intake of red meat, and particularly of processed meat, was associated with a moderate to significant increase in colorectal cancer risk. Average RRs and 95% confidence intervals (CI) for the highest quartile of consumption of red meat were 1.35 (CI: 1.21-1.51) and of processed meat, 1.31 (CI: 1.13-1.51) (Norat et al., 2002).

The correct knowledge toward alcohol intake, processed meat, and salty food attained a higher percentage among physicians. In the Turkish study, 83.9% believed that alcohol has a role in cancer which came near to our result where 81.3% answered correctly (Can et al. 2008). In the same context, correct answers about excess body weight and physical inactivity were significantly higher. The findings of an observational study, over 5.7 years recommended that cancer survivors have to reduce time spent sedentary and to follow a balanced diet with adequate intakes of dietary fiber and micronutrients including carotenoids, vitamin B12 and vitamin C (Ricci

et al., 2020).

Obesity as a result of chronic overfeeding has been linked firmly to an increased risk of a number of cancers like colon cancer as well as on cancer recurrence after treatment (Arends, 2020). Metabolic consequences of obesity may be responsible for triggering and/or promoting growth of cancer and should be attacked by regular moderate physical activity as brisk walking, swimming, cycling in healthy subjects and in cancer survivors.

Among the popular vitamins that are widely available in natural fruit or supplement form, is vitamin C. Some studies showed Vitamin C concentrations from the plasma of cancer patients were significantly reduced when compared to healthy controls. This issue raised several questions about the relation to cancer and vitamin C as antioxidant (Chen et al., 2015). This supplement beside other micronutrients like vitamin E, B12 and selenium are a matter of debate regarding their role in reducing risk or even prevention of cancer.

Age, position and nationalities were the most significant determinant factors for level of knowledge amongst physicians, where Saudi residents have a lower knowledge score. That might be attributed to prolonged exposure to patients and accumulated experience. Similar results supported our findings as in the Jeddah stud (Alkhaldy, 2019) and a study in Iran (Ahmadi et al., 2009) where the age and number of years after graduation have been a significant predictor regarding knowledge of nutrition in general.

In the study of Vetter et al., (2008), medicine interns perceive nutrition counselling as a priority, but they lack confidence and education to practice it with their patients, where 94% agreed that it was their obligation to discuss nutrition with patients, only 14% felt physicians were adequately trained to provide nutrition counseling.

A recent feasibility study published online demonstrated the potential of a 3-hour, online, self-paced nutrition course administered to medical residents to result in a significant and sustained increase in nutrition knowledge and positive attitudes about the role of nutrition in clinical practice (Shafto et al., 20020). In the same context, Self-reported nutritional knowledge and intentions towards nutritional counselling, including attitude, self-efficacy and social support have been increased significantly among physicians after being exposed to a Self-reported nutritional knowledge and intentions towards nutritional counselling, including attitude, self-efficacy and social support (Coppoolse et al., 2020).

Though primary physicians in the current study have good knowledge about nutrition and cancer; their practice and nutrition counseling is poor with their patients as only less than half of them usually are practicing nutritional counseling with their patients. The study of Fahd et al revealed that there was a positive correlation between knowledge and performance about breast cancer, and nutritional status, and they recommended that recommended that educational effective programs should be used in the health and treatment centers to increase the level of knowledge and attitude of women about breast cancer (Falah Asadi et al. 2018)

In conclusion, primary care physicians have a good knowledge about the relation between nutrition and cancer but less than expected. Consultant and non-Saudi nationality physicians more knowledgeable, age and in turn years of experience have a significant role for determining the knowledge level. As primary care physicians are the first defense in health care, they should have continuous nutrition educational training programs to ensure safe and sound nutritional advice not only to patients but also for public. Spreading out the nutrition topics particularly those related to cancer, over a longer period of time delivers the chance to strengthen, apply and practice counselling skills along the curriculum. Further researches are required to appraise the long-term impact of nutrition education curricula primary care physicians' real-time and/or simulated dietary counselling performance, physician practice patterns and eventually patient outcomes.

Limitations

Details on physicians' cancer nutrition counseling is lacking, private sectors were not included in the current study, at last the study was conducted in one city and main hospitals, other cities and peripheral hospitals were not included.

Author Contribution Statement

MAA, HAS and DMR conceptualized and designed the study; FFA, NSM, HMA, AKA, MAA, AAA, AFA and AA collected the data; MAA, HAS analyzed and interpreted the results; MAA, HAS, KHF prepared the initial manuscript; All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

References

Ahmadi A, Ershad M, Givzadeh H, Mohammad-Beigi A (2009). General physicians' knowledge about nutrition in Shiraz, Iran. *Pak J Biol Sci*, **12**, 981-5.
 Alkhalidy AA (2019). Nutritional Knowledge and Self-Reported Nutritional Practice against Malnutrition among Physicians in Jeddah, Saudi Arabia. *Healthcare*, **7**, 149.
 Al-Madani KM, Landman JP, Musaiger A (2004). Nutrition

knowledge, attitudes and practices: A comparison between medical practitioners and medical students in Bahrain. *Health Edu*, **104**, 90-9.
 Al-Zahrani AM, Al-Raddadi RM (2009). Nutritional knowledge of primary health care physicians in Jeddah, Saudi Arabia. *Saudi Med J*, **30**, 284-7.
 Arends J (2020). Nutrition in cancer: Effective in Prevention and Treatment?. *Laryngorhinootologie*, **99**, 149-54.
 Bail J, Meneses K, Demark-Wahnefried W (2016). Nutritional status and diet in cancer prevention. *Semin Oncol Nurs*, **32**, 206-14.
 Can HO, Ceber E, Sogukpinar N, et al (2008). Eating habits, knowledge about cancer prevention and the HPLP scale in Turkish adolescents. *Asian Pac J Cancer Prev*, **9**, 569-74.
 Chakraborty A, Guha S, Chakraborty D (2020). Micronutrients in preventing cancer: A Critical Review of Research. *Asian Pac Cancer Biol*, **5**, 119-25.
 Chen Q, Polireddy K, Chen P, Dong R (2015). The unpaved journey of vitamin C in cancer treatment. *Can J Physiol Pharmacol*, **93**, 1055-63.
 Coppoolse HL, Seidell JC, Dijkstra SC (2020). Impact of nutrition education on nutritional knowledge and intentions towards nutritional counselling in Dutch medical students: an intervention study. *BMJ Open*, **10**, e034377.
 Daradkeh GA, Al Bader K, Singh R (2012). The nutrition knowledge of primary care physicians in the state of Qatar. *Pak J Nutr*, **11**, 781-5.
 Donaldson MS (2004). Nutrition and cancer: a review of the evidence for an anti-cancer diet. *Nutr J*, **3**, 19.
 Falah Asadi A, Shahsavari S, Khosravizadeh O, Nourmohammadi, M (2018). The relationship between knowledge, attitude, and performance in breast cancer with nutritional behaviors and drug use. *Asian Pac J Environ Cancer*, **1**, 27-33.
 Hawrysz I, Krusińska B, Słowińska MA, et al (2016). Nutritional knowledge, diet quality and breast or lung cancer risk: a case-control study of adults from Warmia and Mazury region in Poland. *Rocz Panstw Zakl Hig*, **67**, 9-15.
 Key TJ, Schatzkin A, Willett WC, et al (2004). Diet, nutrition and the prevention of cancer. *Public Health Nutr*, **7**, 187-200.
 Kirbiyik F, Ozkan E (2018). Knowledge and practices of medical oncologists concerning nutrition therapy: A survey study. *Clin Nutr ESPEN*, **27**, 32-7.
 Michels KB (2005). The role of nutrition in cancer development and prevention. *Int J Cancer*, **114**, 163-5.
 Norat T, Lukanova A, Ferrari P, Riboli E (2002). Meat consumption and colorectal cancer risk: dose-response meta-analysis of epidemiological studies. *Int J Cancer*, **98**, 241-56.
 Ricci C, Freisling H, Leitzmann MF, et al (2020). Diet and sedentary behaviour in relation to cancer survival. A report from the national health and nutrition examination survey linked to the U.S. mortality registry. *Clin Nutr*, **39**, 3489-96.
 Schmandt RE, Iglesias DA, Co NN, Lu KH (2011). Understanding obesity and endometrial cancer risk: opportunities for prevention. *Am J Obstet Gynecol*, **205**, 518-25.
 Shafto K, Shah A, Smith J, et al (2020). Impact of an online nutrition course to address a gap in medical education: A Feasibility Study. *PRIMER*, **4**, 5.
 Shams-White MM, Brockton NT, Mitrou P, et al (2019). Operationalizing the 2018 World Cancer Research Fund/ American Institute for Cancer Research (WCRF/AICR) Cancer Prevention Recommendations: A Standardized Scoring System. *Nutrients*, **11**, 1572.
 Story MT, Neumark-Stzainer DR, Sherwood NE, et al (2002). Management of child and adolescent obesity: attitudes, barriers, skills, and training needs among health care professionals. *Pediatrics*, **110**, 210-4.

- Vetter ML, Herring SJ, Sood M, Shah NR, Kalet AL (2008). What do resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. *J Am Coll Nutr*, **27**, 287-98.
- Vingeliene S, Chan DSM, Vieira AR, et al (2017). An update of the WCRF/AICR systematic literature review and meta-analysis on dietary and anthropometric factors and esophageal cancer risk. *Ann Oncol*, **28**, 2409-19.
- Willett WC (2010). Fruits, vegetables, and cancer prevention: turmoil in the produce section. *J Natl Cancer Inst*, **102**, 510-1.
- Xiao Y, Xia J, Li L, et al (2019). Associations between dietary patterns and the risk of breast cancer: a systematic review and meta-analysis of observational studies. *Breast Cancer Res*, **21**, 16.
- Yang M, Kenfield SA, Van Blarigan EL, et al (2015). Dietary patterns after prostate cancer diagnosis in relation to disease-specific and total mortality. *Cancer Prev Res*, **8**, 545-51.
- Yang WS, Zeng XF, Liu ZN, et al (2020). Diet and liver cancer risk: a narrative review of epidemiologic evidence. *Br J Nutr*, **124**, 330-40.



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