Development and psychometric testing of a Gastric Cancer Behavioural Risk Assessment Inventory (GC-BRAI)

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Abstract

Background: Gastric cancer (GC) is one of the most common cancers worldwide. There is no disease-specific tool for GC risk assessment in research and practice settings within the Iranian sociocultural context.

Aims: To develop and assess the psychometric properties of the Gastric Cancer Behavioral Risk Assessment Inventory (GC-BRAI) in GC patients in Northwest Islamic Republic of Iran.

Methods: Face-to-face interviews were performed on a convenient sample of 175 GC patients and a purposive sample of 350 matched non-GC patients as a control group. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to appraise the structure validity of GC-BRAI and examine its possible latent constructs.

Results: The designed instrument with its 5 latent factors indicated acceptable internal consistency (0.72), reliability (0.99) and fit indices (χ^2/degrees of freedom = 2.24, root mean square error of approximation = 0.049, adjusted goodness of fit index = 0.91 and root mean square residual = 0.085). The identified components were specific nutritional behaviours, typical daily diet, routine heartburn-causing behaviours or foods in diet, daily use of rice and smoked foods, and tobacco smoking/alcohol consumption, which all indicated a significant association (P= 0.0001) with high-risk of GC.

Conclusions: GC-BRAI can be considered a feasible tool to measure individual GC risk and a reliable data collection instrument in tailor-made risk reduction interventional programmes.

Keywords: gastric cancer, health behaviour, psychometrics, questionnaire design

Introduction

Cancer is among the leading causes of death worldwide after cardiovascular disease and the second most prominent cause of death in less-developed countries (*1,2*). Gastric cancer (GC) ranks among the top causes of cancer-related deaths worldwide, with ~1 million new cases detected annually and an estimated 783 000 (8.2%) deaths (*3,4*). Almost 75% of new cases of GC occur in developing countries (*5,6*). In the Islamic Republic of Iran, GC is the leading cause of cancer mortality in men and the second main cause in women. The reported standardized incidence rate of GC for Iranian men and women is 19.6 and 10.0 per 100 000 population, respectively (*7*). Although GC-induced mortality has declined significantly in most developed countries over the past few decades, it is still high in some Asian, Eastern European and South American countries (*8,9*). During the past few years, the incidence and mortality of GC have increased in the Islamic Republic of Iran (*10*), and GC has become the second most common malignancy after lung cancer and the leading cause of cancer deaths (*11*). GC is the most prevalent cancer among Iranian men and the third most common among women (*12*). The highest incidence of cancer has been reported in the north and northwest of the country, mainly in the Gilan, Mazandaran, Golestan, Ardabil and East Azarbaijan Provinces (*13*).

Previous studies have shown that modifications in diet and food preparation methods can reduce GC incidence (*14*). Based on empirical research evidence, behavioural risk factors currently are important determinants of GC (*15*). GC prevention strategies, therefore, are focused on behavioural changes (*16*).

GC is a multifaceted disease and a wide range of environmental and genetic factors could play a role in its distribution (*17*). The major reported risk factors for GC include: family history; Helicobacter pylori infection (*18*); dietary habits such as consumption of salt-cured and smoked meat, fried foods, and spicy and nitrate-containing foods; consumption of alcoholic drinks; cigarette smoking; and occupational exposure to heavy metals such as cadmium and lead (*15*). Suggested GC protective measures include daily consumption of adequate servings of green vegetables and fresh fruit, especially citrus fruits with high vitamin C content (*19*).

Several studies have used exploratory factor analysis (EFA) to identify potential dietary risk factors for GC (*20,21*). However, no study has investigated the possible relationship between dietary/nondietary behavioural

patterns and development of GC in Iranian or other Persian-speaking populations. Through classifying individual risk factors into exposure categories and aggregation of these potential risk factors into distinct risk components, the GC risk pathways and behavioural patterns can better be explained. The purported advantages of lifestyle change in prevention of GC mean that targeting modifiable risk factors (e.g., poor dietary habits) is considered essential in interim interventional programmes (21). The main encouragements for the present study were: current trends in the incidence of GC in the Islamic Republic of Iran (13); empirical evidence about the effectiveness of behaviour change on the epidemiological profile of GC (21); and lack of a specific tool to appraise individuals' GC risk pattern. We aimed to develop and psychometrically assess a definitive questionnaire for GC risk assessment that might be applicable for risk stratification and mitigation in research and practice settings.

Methods

Participants

This case–control study consisted of a convenience sample of 175 GC patients and a purposive sample of 350 age- and sex-matched non-GC controls who were admitted to 3 hospitals (Imam Reza, Shahid Ghazi Tabatabai, and Alinasab) with oncology wards in Tabriz, East Azarbaijan Province, Islamic Republic of Iran.

The study was conducted in accordance with the ethical standards in the Declaration of Helsinki, and the Medical Ethics Review Board of Trustees (MERBoT) in Tabriz University of Medical Science approved all of the study procedures (approval number: 5/D/1026302-1397-12-05). Inclusion criteria for cases were diagnosis of GC and age 18–85 years. Inclusion criteria for controls were admission for any disease other than GC and age 18–85 years. The exclusion criterion for GC patients was any type of concurrent cancer due to immunodeficiency. The exclusion criterion for the control group was GC caused by metastasis from an extra-gastrointestinal tract malignancy. The study participants were also excluded if they had any other critical health condition.

The rounded up (to the nearest 5) proportions of the respondents (25% in the controls and 45% in the cases) that reported a high-risk dietary habit (e.g., reusing cooking oil) in the study of Salvador et al. (22) were utilized to decide on the study sample size. To improve precision of estimates, a one-to-many matching approach (2:1 ratio of controls to cases), type 1 error of 0.05 and test power of 0.90 were deemed as prior statistical parameters in STATA version 13 software (StataCorp LP, College Station, TX, USA). Thus, a minimum sample size of 175 subjects per group was estimated to be appropriate to satisfy the statistical significance threshold, although 175 patients were included in the case group and 350 matched individuals in the control group. Face-to-face interviews were conducted for data collection purposes from 9 April 2017 to 20 June 2018. The study participants gave their written informed consent to participate in the study.

Instrument development stages

The item pool was based on an extensive literature search and interviews with relevant healthcare professionals. Thus, 22 items were generated and validity and reliability appraisal procedures were used to assess psychometric properties of the adapted instrument. The preliminary draft of the Gastric Cancer Behavioral Risk Assessment Inventory (GC-BRAI) was sent to 12 healthcare professionals for their comments on face and content validities of the questionnaire, including lucidity of the wording and ability of the items to communicate the messages of interest to potential readers. They were also asked to comment on a 5-point Likert scale about importance, necessity or redundancy of the items. The content validity index and content validity ratio were used to quantitatively validate the designed instrument. The calculated content validity index (0.68) and content validity ratio (0.83) were in the vicinity of the acceptable range (23); therefore, no changes were made to the preliminary draft of the GC-BRAI. A sample of GC and non-GC patients (15 from each group) was approached in the next step to canvass their opinions about the simplicity, clarity and consistency of the items. Minor modifications were made to the items based on these comments.

Reliability of the GC-BRAI

We estimated the test–retest reliability of the scales and Cronbach's α as the measure of internal consistency and intraclass correlation coefficient (ICC) as the reliability index of the constructed tool (60 GC and non-GC patients completed the scale within 30 days). Exploratory factor analysis (EFA) was performed by main factors analysis using Varimax rotation on a randomly selected sample of half of the GC patients (n = 78) and non-GC patients (n = 77) to assess construct validity of the scale. To include an item in EFA, the minimum factor load was assumed to be 0.3. AMOS software was used to evaluate the factor construct and to determine the goodness of fit indices (GFIs).

The scale items' response choices were considered as: not at all (1), rarely (2), sometimes (3), most of the time (4) and always (5). Some of the items were positive statements representing proven preventive impact on GC, that is, Q1, Q2, Q3, Q5, Q12 and Q16; therefore, they were reverse scored so that the higher score implied a high-risk behavioural pattern of GC. Respecting the number of composed scale's items (22), values of the respondents' total score was considered to be in the range of 22–110, with higher score reflecting a higher risk of GC.

Data analysis results for continuous variables was presented as mean (standard deviation) and for categorical variables as numbers and frequencies. Conditional logistic regression analysis was used for data analysis because of the one-to-many matched case–control design, and having a series of observations that were not independent but matched for sex and age. Conditional logistic regression is an extension of logistic regression that allows one to take into account stratification and matching in the data analysis. The data analysis was performed using R version 3.6.1 (survival package).

Results

There were 175 patients with GC in the case group: 118 (67.4%) male and 57 (32.6%) female, with a mean age of 57.03 (12.23) years and mean body mass index (BMI) of 25.72 (4.25) kg/m2. There were 350 controls: 236 (67.4%) male and 114 (32.6%) female, with a mean age of 57.03 (12.21) years and mean BMI of 24.9 (2.96) kg/m2. BMI differed significantly between the groups ($P = 0.012$). The approximated Cronbach's α 0.72 and ICC 0.99 represented acceptable internal consistency (24) and reliability of the developed scale (25) over time.

The Kaiser–Meyer–Olkin measure of sampling adequacy (0.771) and Bartlett's test of sphericity (1883.35, df = 231, $P < 0.001$) as preanalysis verification indices to perform factor analysis on the study data were in the vicinity of acceptable ranges (26).

The EFA analysis results demonstrated a 5-factor solution representing that the designed scale's items can be classified effectively into the 5 distinct constructs according to their loadings for the components that together accounted for 47.46% of the total variance (Table 1).

The identified latent components were specific nutritional behaviours, typical daily diet, routine heartburn causing behaviours or foods in diet, daily use of rice and smoked foods, and tobacco smoking and alcohol consumption (Table 2).

To verify the number of factor solutions and give a visual representation of the possible factor solutions, we analysed the scree plot (Figure 1). The plot indicated a levelling off the Eigenvalues after 5 factors were extracted. The first extracted latent variable explained a disproportionate amount of the variability in the data set. However, due to the inherent subjectivity that is involved in interpreting scree plots and considering theoretical cohesion of the other variables, the appropriate number of variables was based on the study data structure.

The prior factor structure of the GC-BRAI, which had been extracted by EFA, was also examined by confirmatory factor analysis (CFA) to verify a good data fit with the hypothesized factorial structure. CFA was conducted on a sample comprising the other half of the GC patients (n = 77) added to the randomly selected sample of non-GC patients ($n = 78$). The $\chi 2$/df ratio = 2.24 ($P < 0.05$), root mean square residual = 0.085, GFI = 0.86,

Table 1 Loadings values for the Gastric Cancer Behavioral Risk Assessment Inventory (GC-BRAI) items

Items		Latent variables				
		1	2	3	4	5
1	Did you generally eat vegetables with meals?	0.778				
2	Did you eat at least two servings of fruit daily?	0.663				
3	Did you eat nuts every day or once every few days?	0.627				
4	Did you eat nuts and fruit at night before going to bed?	0.622				
5	Did you eat soybeans?	0.542				
6	Did you eat fruits like apples and cucumbers with peel?	−0.465				
7	Did you use ready-to-eat meat products like sausage every day or once every few days?		0.742			
8	Did you routinely eat canned foods like tuna fish every day?		0.673			
9	Did you drink bottled water every day?		0.637			
10	Did you generally drink carbonated beverages with meals?		0.636			
11	Did you generally eat your meal with spicy condiments?			0.611		
12	Did you have normal bowel movement every day?			0.594		
13	Did you go to bed immediately after eating on day and/or at night?			0.531		
14	Did you generally eat pickles with meals?			0.523		
15	Did you immediately drink tea after meals?			0.424		
16	Did you routinely use Iranian rice crops in your daily diet?				0.829	
17	Did you routinely use imported rice crops in a daily diet?				0.816	
18	Did you eat smoked rice routinely?				-0.306	
19	Did you drink domestic or homemade alcoholic beverages?					0.724
20	Did you smoke every day?					0.716
21	Did you wake up at night because of heartburn?					0.491
22	Did you smoke hookah at least once every week or every two weeks?					0.491

Table 2 **The latent variables' eigenvalues and percentage of explained variance for the Gastric Cancer Behavioral Risk Assessment Inventory (GC-BRAI)**

Latent variables	Initial Eigenvalues	% of explained variance	% of cumulative variance
Specific nutritional behaviors	3.72	16.91	16.91
Canned and processed foods in daily diet	2.63	11.98	28.89
Routine heartburn causing behaviors or foods in diet	1.55	7.06	35.95
Daily use of rice and smoked foods	1.31	5.97	41.93
Tobacco smoking and alcohol drinking	1.21	5.52	47.46

root mean square error of approximation = 0.049) and adjusted GFI = 0.91 demonstrated an acceptable model fit with the 5-factor solution (Figure 2). The item-to-factors correlations and the observed correlations among the 5 factors (Figure 2) were significant ($P < 0.05$).

Mean scores of the GC and non-GC patients based on each single item, identified factors and total GC-BRAI scores are shown in Table 3. Except for eating fruits like apples and cucumbers with peel, the identified latent variables and total GC-BRAI scores were significantly lower in non-GC than in GC patients (Table 3). Based on the data in Figure 2 and Table 3, the following could be considered as high-risk behavioural patterns for GC: high-risk nutritional/non-nutritional habits such as eating late at night and before going to bed; not having the recommended portions of fruits and vegetables in the daily diet; frequent inclusion of processed and canned foods in the daily diet; routinely having foods or behaviours that cause heartburn; routine consumption of rice and smoked foods; and regular tobacco smoking and alcohol consumption.

Discussion

Given the lack of a common and intelligible tool for application in research and practice settings to recognize people at greater risk for GC, this study was conducted to design and appraise psychometric properties of GC-BRAI in a sample of GC and non-GC patients in the Islamic Republic of Iran. The data indicated an acceptable validity and reliability of the constructed 22-item tool with 5 dimensions. The initial conceptual factors and items were retrieved through an extensive literature search and a preliminary draft of the developed scale was verified by a panel of experts. The designed instrument confirmed an acceptable internal consistency, reliability and a good fitting measurement model. The GC-BRAI identified 5 latent variables that represented potential GC-causing high-risk lifestyle behaviour.

Figure 1 **Scree plot representing the eigenvalues of the extracted variables obtained in a principal-component analysis of the Gastric Cancer Behavioral Risk Assessment Inventory (GC-BRAI).**
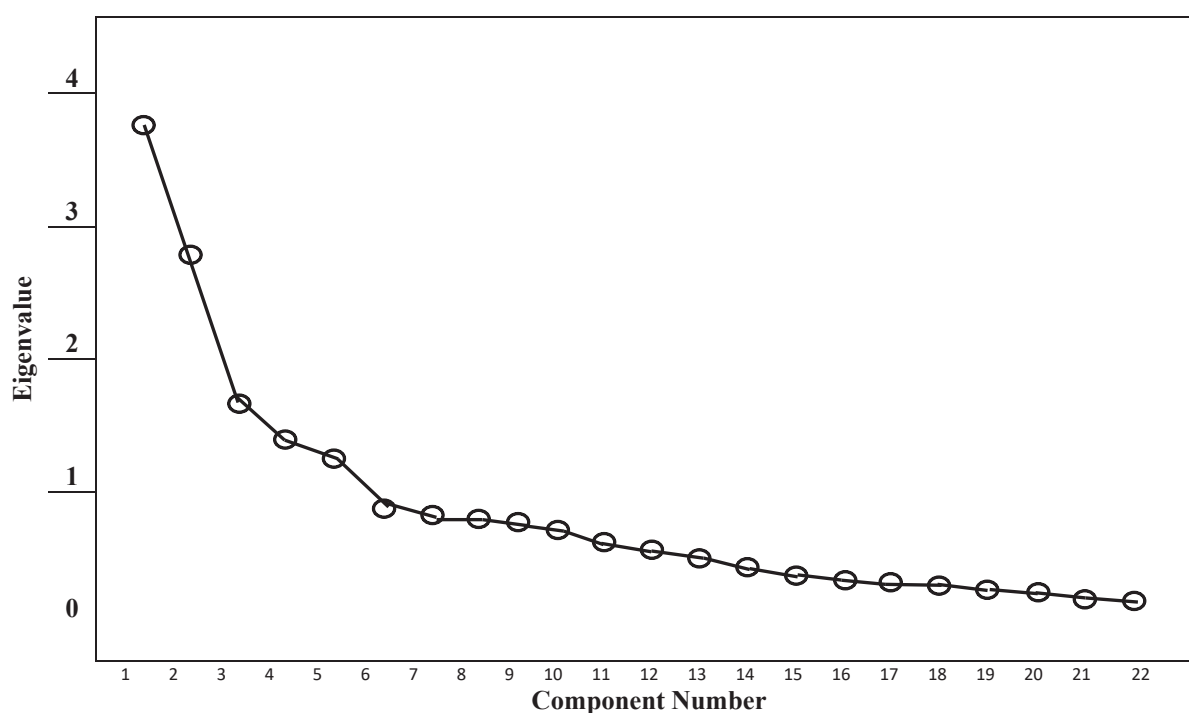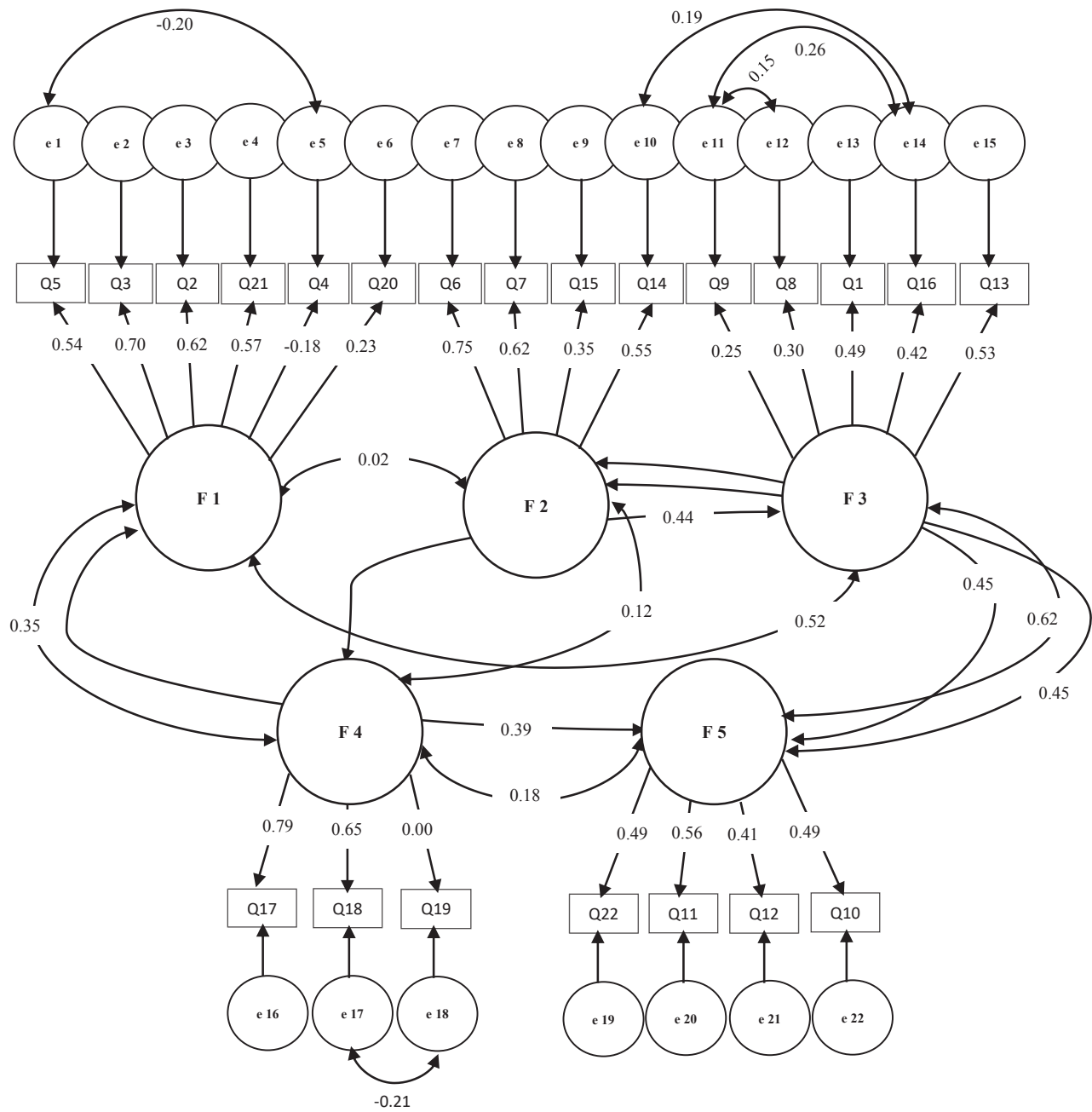
Figure 2 The path diagram of the identified latent variables in the GC-BRAI verified by the confirmatory factor analysis model.

F1: Specific nutritional behaviors

F2: Canned and processed foods in daily diet

F3: Routine heartburn causing behaviors or foods in diet

F4: Daily use of rice and smoked foods

F5: Tobacco smoking and alcohol drinking

Our results agree with those reported in the literature. Frequent consumption of salty food, heavy smoking and high alcohol consumption are suggested to increase the risk of GC (27–31). History of gastroesophageal reflux, low fruit and vegetable consumption, intake of nitrites in canned and processed foods, low amounts of nuts and peanut butter consumption are also reported to increase the risk of GC (32–34). All these results provided empirical support for the psychometric soundness and utility of the GC-BRAI.

GC-BRAI is a simple tool for assessing the risk profile for development of GC and could be helpful to healthcare professionals and researchers seeking to identify GC risk of their target groups. The instrument could also be used in assessment of lifestyle as a part of regular health assessment programmes and in health research to assess effectiveness of the GC-targeted interventions,

or to identify important behavioural antecedents of the disease in GC patients. In more tailored applications, GC-BRAI may be used to reveal insights into the level and components of GC risk of individuals.

We made efforts to have a diverse team of researchers in order to collect a range of opinions about the validity of the items in GC-BRAI and its cross-country applicability (35). The study sample consisted only of Iranian GC and non-GC patients, which may restrict the applicability of GC-BRAI in other cultures. Crosscultural differences in daily diet and lifestyle could cause heterogeneous variance in responses. Therefore, universal applicability of the developed tool should be considered with caution given the unrepresentativeness of our study sample. Future research may alleviate these limitations by conducting crosscultural tests of the GC-BRAI on broader and more diverse populations. Reliance on self-reported

Table 3 Mean scores for Gastric Cancer Behavioral Risk Assessment Inventory (GC-BRAI) items and latent variables among the studied GC and non-GC patients.

GC-BRAI Items		Mean (SD)		P
		GC patients (n= 175)	Non GC patients (n= 350)	
1	Did you generally eat vegetables with meals?	3.60 (1.12)	2.75 (1.17)	0.0001
2	Did you eat at least two servings of fruits daily?	3.82 (1.24)	2.75 (1.25)	0.0001
3	Did you eat nuts every day or once every few days?	4.14 (0.90)	3.46 (1.02)	0.0001
4	Did you eat nuts and fruits at nights before going to bed?	2.09 (1.15)	3.04 (1.18)	0.0001
5	Did you eat soybeans?	3.75 (0.89)	3.31 (1.16)	0.0001
6	Did you eat fruits like apples and cucumbers with peel?	3.07 (1.40)	3.18 (1.32)	0.3840
Subscale	Specific nutritional behaviours	18.41 (3.07)	15.48 (2.87)	0.0001
7	Did you use ready-to-eat meat products like sausage every day or once every few days?	2.14 (0.95)	1.73 (0.89)	0.0001
8	Did you routinely eat canned foods like tuna fish every day?	2.53 (0.98)	1.95 (0.94)	0.0001
9	Did you drink bottled water every day?	2.20 (1.11)	1.89 (1.02)	0.007
10	Did you generally drink carbonated beverages with meals?	2.78 (1.21)	2.33 (1.18)	0.0001
Subscale	Canned and processed foods in daily diet	9.66 (2.82)	7.90 (2.75)	0.0001
11	Did you generally eat your meal with spicy condiments?	3.12 (1.18)	2.28 (1.16)	0.0001
12	Did you have normal bowel movement every day?	3.05 (1.06)	3.74 (1.28)	0.0001
13	Did you go to bed immediately after eating on day and/or at night?	3.41 (1.21)	2.46 (1.23)	0.0001
14	Did you generally eat pickles with meals?	3.61 (1.09)	2.88 (1.22)	0.0001
15	Did you immediately drink tea after meals?	4.00 (1.41)	3.00 (1.36)	0.0001
Subscale	Routine heartburn causing behaviours or foods in diet	17.21 (2.96)	14.39 (2.98)	0.0001
16	Did you routinely use Iranian rice crops in your daily diet?	3.26 (1.39)	2.87 (1.31)	0.0050
17	Did you routinely use imported rice crops in a daily diet?	3.40 (1.33)	2.63 (1.33)	0.0001
18	Did you eat smoked rice routinely?	2.44 (1.30)	2.16 (1.20)	0.0170
Subscale	Daily use of rice and smoked foods	9.10 (2.47)	7.68 (2.46)	0.0001
19	Did you drink domestic or homemade alcoholic beverages?	1.29 (0.79)	1.08 (0.45)	0.0001
20	Did you smoke every day?	2.20 (1.66)	1.50 (1.20)	0.0001
21	Did you wake up at night because of heartburn?	2.61 (1.32)	1.68 (1.02)	0.0001
22	Did you smoke hookah at least once every week or every two weeks?	1.80 (1.39)	1.27 (0.78)	0.0001
Subscale	Tobacco smoking and alcohol drinking	7.90 (3.23)	5.55 (2.27)	0.0001
Total GC-BRAI score		64.32 (8.29)	54.14 (7.05)	0.0001

lifestyle behaviour could have been another source of bias in our study. Further research is recommended by adding other sources of measurement when dealing with individual GC antecedents.

Although we collected data through positively and negatively expressed questions, personal reservations to answer a specific questions, for example, about alcohol consumption or smoking, should be considered in the interpretation of the findings. The GC-BRAI items were focused on individual risk factors and probable effects of environmental factors, such as pollutants, food toxicities and psychosocial covariates, were not studied. Inclusion of these variables and examination of the possible pathways between GC and environmental and community level factors is recommended in future studies.

Conclusion

There has been a paucity of research on the behavioural risk factors for GC, which has been partially hampered by the absence of a valid tool to measure individual GC risk. Therefore, GC-BRAI could provide research evidence to be used for prevention of GC. GC-BRAI can be used to measure individual-level GC risk, which justifies its applicability in tailor-made risk reduction interventional programmes. This concise scale could help with research on GC risk assessment and ultimately contribute to prevention or early detection of the disease.

Mise au point et test psychométrique d'un inventaire d'évaluation du risque comportemental de cancer de l'estomac (Gastric Cancer Behavioural Risk Assessment Inventory, GC-BRAI)

Résumé

Contexte : Le cancer de l'estomac est l'un des cancers les plus fréquents dans le monde. Dans le contexte socioculturel iranien, il n'existe pas d'outil spécifique à la maladie pour l'évaluation du risque de cancer de l'estomac dans le cadre de la recherche et de la pratique.

Objectifs : Mettre au point et évaluer les propriétés psychométriques de l'inventaire d'évaluation du risque comportemental de cancer de l'estomac chez les patients atteints de ce type de cancer dans le nord-ouest de la République islamique d'Iran.

Méthodes : Des entretiens en présentiel ont été réalisés sur un échantillon de commodité de 175 patients atteints de cancer de l'estomac et sur un échantillon ciblé de 350 patients appariés non atteints de cancer de l'estomac comme groupe témoin. Une analyse factorielle exploratoire et une analyse factorielle confirmatoire ont été effectuées pour évaluer la validité structurale du GC-BRAI et examiner ses possibles structures latentes.

Résultats : Les résultats de l'analyse factorielle exploratoire et de l'analyse factorielle confirmatoire ont montré que le modèle à cinq facteurs avait des indices d'ajustement acceptables ($\chi 2$/degrés de liberté = 2,24, erreur quadratique moyenne d'approximation = 0,049, indice d'ajustement comparatif = 0,86, validité ajustée de l'indice d'ajustement = 0,91, validité de l'indice d'ajustement = 0,93 et résidu quadratique moyen = 0,085). Les éléments identifiés étaient les comportements nutritionnels spécifiques, le régime alimentaire quotidien typique, les comportements ou aliments courants provoquant des brûlures d'estomac, la consommation quotidienne de riz et d'aliments fumés et la consommation de tabac/alcool, qui indiquaient tous une association significative (p= 0,0001) avec un risque élevé de cancer de l'estomac.

Conclusions : Le GC-BRAI peut être considéré comme un outil permettant de mesurer le risque individuel lié au cancer de l'estomac et un instrument fiable de collecte de données dans des programmes interventionnels de réduction du risque personnalisés.

إعداد قائمة لتقييم المخاطر السلوكية المرتبطة بسرطان المعدة، وإخضاعها لاختبارات القياس النفسي

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الخلاصة

الخلفية: يعتبر سرطان المعدة من أكثر أنواع السرطان شيوعاً حول العالم. ولا توجد أداة خاصة بمرض معين لتقييم المخاطر المرتبطة بسرطان المعدة في مواقع البحث والممارسات في السياق الاجتماعي والثقافي الإيراني.

الأهداف: هدفت هذه الدراسة إلى تحديد وتقييم خصائص القياس النفسي لقائمة تقييم المخاطر السلوكية المرتبطة بسرطان المعدة في صفوف مرضى سرطان المعدة في شمال غرب جمهورية إيران الإسلامية.

طرق البحث: أُجريت مقابلات وجهاً لوجه مع عينة عشوائية تتكون من 175 مريضاً بسرطان المعدة، وعينة مقصودة متناسبة تتكون من 350 شخصاً غير مريض بسرطان المعدة كمجموعة مرجعية. وأجري التحليل العاملي الاستكشافي والتحليل العاملي التوكيدي لتقييم صلاحية هيكل قائمة تقييم المخاطر السلوكية المرتبطة بسرطان المعدة، واختبار تركيباته الكامنة المحتملة.

النتائج: أشارت الأداة المصممة بعاملها الخامس الكامن إلى تناسق داخلي مقبول (0.72) ، وموثوقية (0.99) ومؤشرات ملائمة (χ^2 / درجة الحرية = 2.24، ومتوسط الخطأ التربيعي الجذري التقريبي = 0.049، والجودة المعدَّلة لمؤشر الملاءمة = 0.91، ومتوسط الجذر التربيعي المتبقي = 0.085). وكانت المكوّنات المحددة هي سلوكيات غذائية معيّنة: النظام الغذائي اليومي المعتاد، والسلوكيات الروتينية أو الأطعمة في النظام الغذائي المسببة للحموضة المعوية، والاستخدام اليومي للأرز والأطعمة المدخنة، وتدخين التبغ / وتعاطي الكحول، وكلها تشير إلى ارتباط كبير ($P = 0.0001$) مع ارتفاع خطر الإصابة بسرطان المعدة.

الاستنتاجات: يمكن اعتبار قائمة تقييم المخاطر السلوكية المرتبطة بسرطان المعدة أداة مجدية لقياس مخاطر سرطان المعدة الفردية وأداة موثوقة لجمع البيانات في برامج التدخل المصممة خصيصاً للحد من المخاطر.

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