Implementation of the Choosing Wisely Program in the General Surgery Residency

Implementação do Programa *Choosing Wisely* no Internato de Cirurgia Geral

ARTIGO ORIGINAL

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ABSTRACT

Introduction: The practice of unnecessary conduct and waste in Health is an important topic, not often addressed during undergraduate training. Medical education has a fundamental role in student and doctors' training concerning cost-conscious attitudes for good health care. The aim of this study was to describe and assess the implementation of the Choosing Wisely campaign within a General Surgery residency program.

Material and Methods: This was an interventional study involving residency advisors and specialty residents. Recommendations based on three procedures frequently used in clinical practice, with no benefits and involving unnecessary risks for patients were identified by residency advisors with the use of the Delphi method and were grouped by frequency and by nature according to the Choosing Wisely layout. Educational actions such as workshops and banner advertising in addition to training activities regarding cost-conscious healthcare were carried out. This subject was also included in the theoretical evaluation of the residency program.

Results: The leading five recommendations were related to (i) computed tomography overuse (versus ultrasound imaging) in patients with suspected acute appendicitis, (ii) multithreaded computed tomography overuse in patients with low-risk trauma, (iii) longer than recommended antibiotic prophylaxis in surgical patients, (iv) longer than recommended preoperative fasting period and (v) upper gastrointestinal endoscopy overuse in surgical patients without an adequate clinical evidence or without the presence of warning signs. Awareness and reflection among participants were improved, leading to high grades in final evaluation.

Discussion: Changes in training regarding quality of care and cost awareness should start throughout undergraduate training, within a learning environment focused on a reflective and evidence-based practice. All the benefits and harms to patients were taken into account in the recommendations that emerged from this study.

Conclusion: The inclusion of this initiative in the General Surgery residency, involving reflective discussions on campaign recommendations regarding procedures frequently used in clinical practice, with no benefits and involving unnecessary risks for patients may lead to more cost-conscious procedures.

Keywords: Healthcare Costs; Internship and Residency; Surgery/education; Unnecessary Procedures

RESUMO

Introdução: A prática de condutas desnecessárias e os desperdícios na saúde são temas importantes e ainda pouco abordados no curso de Medicina. A educação médica tem um papel fundamental na formação de estudantes e médicos com atitudes custo-conscientes para uma boa atenção à saúde. O objectivo deste estudo foi descrever e avaliar a implementação do programa *Choosing Wisely* - Escolhas Criteriosas em Saúde, no internato de Cirurgia Geral.

Material e Métodos: Estudo de intervenção envolvendo orientadores de formação e internos. Utilizando a técnica Delphi, os orientadores de formação identificaram três intervenções frequentemente observadas na prática clínica sem benefício e com potenciais riscos desnecessários para o doente, que geraram recomendações, agrupadas e adaptadas ao formato do programa *Choosing Wisely*. O tema foi incluido na avaliação do internato, tendo sido desenvolvidas ações de formação e de divulgação em *banners* personalizados, a par de atividades de aprendizagem reflexiva sobre o programa e da integração da temática na avaliação teórica do internato

Resultados: As cinco principais recomendações referem-se (i) à utilização excessiva de tomografia axial computorizada na abordagem da suspeita de apendicite aguda e (ii) de tomografia axial computorizada de vários segmentos do corpo em traumatismos de baixo grau de gravidade, (iii) profilaxia antibiótica mais prolongada do que o recomendado no doente cirúrgico, (iv) jejum mais prolongado do que o recomendado no pré-operatório de todas as cirurgias e (v) utilização excessiva da endoscopia digestiva alta em doentes cirúrgicos sem sinais clínicos de alarme. As ações de formação geraram um incremento da sensibilização e reflexão, traduzido globalmente por um elevado aproveitamento na avaliação final.

Discussão: A formação em escolhas criteriosas em saúde, promovendo uma utilização de cuidados de saúde consciente e de qualidade, sugere que as mudanças devem ocorrer ao longo do curso de Medicina, num ambiente de aprendizagem centrado numa prática reflexiva e baseada na evidência. As recomendações produzidas no estudo tiveram em consideração a totalidade dos benefícios e riscos para o doente.

Conclusão: A integração da iniciativa *Choosing Wisely* no programa de formação em Cirurgia Geral deu origem a um conhecimento e discussão mais reflexivos sobre as recomendações relativas à utilização racional e criteriosa de cuidados de saúde, podendo resultar numa prática médica mais sustentável e sensível aos custos que gera.

Palavras-chave: Cirurgia/ensino; Custos de Cuidados de Saúde; Internato e Residência; Procedimentos Desnecessários

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INTRODUCTION

A culture in which the quality of healthcare is directly related to the number of diagnostic tests and procedures currently exists.[1] The practice of 'the more the better' leads to overuse in healthcare, with benefits that do not outweigh the risks of affecting the patient's health. Overdiagnosis and overtreatment are key determinants of rising healthcare costs.[2] Low-value care almost always represents care with an unfavourable risk-benefit ratio for the patient.[2,3]

Waste in health services is a major cause of cost overruns. The use of these resources should be carefully considered, based on well-founded practices with quality healthcare as primary objective.[2,3] The US Institute of Medicine (IOM) has reached the conclusion in 2010 that unnecessary healthcare services are the leading cause of resource waste, representing 210 billion US dollars of excessive public spending each year with overuse and inappropriate use of antibiotics, imaging tests and surgical interventions, among other costs.[4,5]

The engagement of physicians in cost-conscious care attitudes is crucial, as medical decisions account for 80% of healthcare expenditure.[6] A study by the American Board of Internal Medicine Foundation (ABIM Foundation) found that most physicians (66%) are aware of their responsibility to reduce unnecessary tests and procedures, while only 20% of physicians always or almost always discuss health care costs with their patients.[7] This behaviour is partly due to the practice of defensive medicine, which occurs when tests or procedures are requested with the aim of reducing the exposure to medical liability issues.[8]

One way to address the situation involves producing specific recommendations to be discussed with physicians and patients. The Choosing Wisely (CW) campaign was developed in 2012 by the ABIM Foundation in the United States to approach this subject. The campaign was not primarily aimed to save resources, but to improve the quality of healthcare, which should be individualised and evidence-based, thus increasing the likelihood of benefit and reducing the risk of harm to patients. The CW campaign has grown rapidly, having so far been adopted by more than 80 medical societies in about 20 countries, grouped into the international Choosing Wisely.[3]

Surgical specialties are actively involved in the promotion of the CW programme, which began in the United States and Canada.[3] In 2015, the Choosing Wisely Brazil campaign emerged as a collaborative project supported by Proqualis, an organisation linked to the Institute of Communication and Scientific Information and Technology in Health, a permanent source of consultation and updating for healthcare professionals. Different medical societies were also involved in the CW campaign in Brazil, with the Brazilian Society of Cardiology as a pioneer in the application of the model that has not yet been adopted by the Brazilian College of Surgeons.[9]

The involvement of medical students is planned in the CW campaign, although it has so far been scarce in medical schools.[3,10] This study aimed at describing and assessing the implementation strategies of the CW programme in the General Surgery residency in Brazil, considering the importance of addressing interventions frequently found in clinical practice, without benefits and with potential unnecessary risks for the patients and the need for a careful use of health resources,

MATERIAL AND METHODS

This was an eight-week intervention study involving training mentors and registrars attending the 10th semester of the surgery residency. The Delphi method was used to construct the list of recommendations[11] based on which an online questionnaire was used by mentors to assess three interventions that occur frequently in clinical practice with no benefits and potential unnecessary risks to the patients. The recommendations were grouped by the research team by topic and citation frequency and adapted to the format recommended by CW. Repeated topics, those lacking scientific evidence or with inadequate recommendations were excluded from the study. In the first phase, three interventions with no benefits for the patients were considered by training mentors (N = 10). Upon analysis, exclusion and grouping of the 30 interventions, 13 were formatted according to the CW recommendations and were included in the second phase. A Likert-type scale (4: totally agree; 3: partially agree; 2: partially disagree; 1: totally disagree) was used to assess the final opinion of the training mentors on the five most relevant recommendations in the training sessions, selected by the highest frequency of agreement (Fig. 1).[12]

During the programme, trainees and mentors attended the following actions: 1) Two-hour training session using audio-visual resources and active learning methodology with the following content: presentation of objectives, training steps and rationale of the CW campaign; discussion of the recommendations included in the final list with evidence-based justifications; conclusions and final discussion of the training content. Once the action was completed, participants were asked to respond to an online questionnaire with three questions about the training: (i) content of the campaign presentation; (ii) quality of the presentation and (iii) discussion made by the mentors; 2) Placing of banners with the five selected recommendations at the training camps; 3) Campaign disclosure through the institution's communication channels (literature and videos on the campaign principles); 4) Approach to the CW programme in theoretical-practical activities.

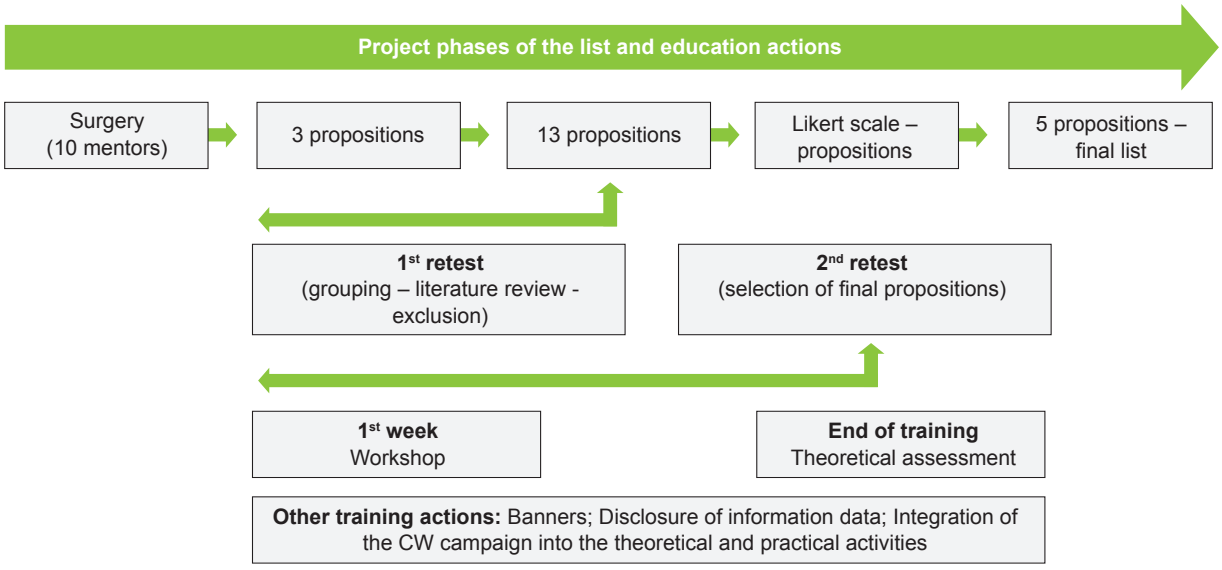

Figure 1 – Project phases of the list of recommendations and training program of the Choosing Wisely campaign integrated into the general surgery residency

The recommendations were addressed in the theoretical assessment at the end of the residency as descriptive clinical cases aimed at assessing the participants' achievement and reflective attitude towards the CW programme.

Questionnaires were applied online at all stages of the study by using SurveyMonkey and sent to the participants' email address. Quantitative variables were analysed using SPSS 23.0 software. Results were presented as frequency distribution charts and percentages for categorical variables and as mean and standard deviation or median and interquartile range for quantitative variables.

The GREET training programmeme analysis checklist was used for improved transparency and reproducibility of the study.[13]

The study was approved by the Research Ethics Committee of the *Escola Bahiana de Medicina e Saúde Pública* (registration number 1,627,477) and in accordance with Resolution 466/2012 of the National Health Council and the Declaration of Helsinki. Written informed consent was obtained from all study participants.

RESULTS

Ten mentors were included in the project [median age of 44 (IQR: 34.5 - 52.5) and male gender predominance (80.0%)]. The median time after graduating from medical school was 22 years (IQR: 11.5 - 29.5). All participants worked in public and private sectors, combining inpatient and outpatient activities. About 90% had a consultant degree and previous knowledge on the CW campaign was described by 70% of these.

Ninety-eight of the 102 registrars participated in the study, while four were excluded (three due to having not fully completed the questionnaire and one due to participation in the CW research group). The median age was 23 (IQR: 22 - 24), with female predominance (64%).

Three interventions with no benefits and involving potential unnecessary risks to the patients that occur frequently in clinical practice were identified by the advisors, leading to 30 recommendations, from which seven were excluded as they were presented as a scattered approach without adequate clarity, applied to unspecific situations in which the recommendations could be applied or lacking scientific evidence. After grouping the remaining 23 recommendations and excluding repeated subjects, 13 recommendations were presented according to the CW campaign format and were sent back (retested) to the mentors for selection of the top five, using a Likert scale (Table 1).

Since the same score was obtained by recommendations no. 4, 5 and 6, recommendation no. 6 was excluded from the main list by the mentors and researchers, as recommendation no. 2 already covered the use of antibiotics, with a special relevance as it covered preoperative antibiotic prophylaxis. This final list was disclosed to all participants.

The training session was attended by mentors and registrars and was carried out in an interactive way, including the presentation of CW programme history, objectives and theoretical basis. The methodology of this study and the five selected recommendations were addressed from drafting to the final list, leading to a discursive and reflective process among the participants. The evaluation of the training action is described in Table 2.

At the end of the training programme, the participants were submitted to a descriptive theoretical assessment of clinical cases, in which two of the five recommendations were approached.

Table 1 – Frequency of the 13 recommendations suggested by ten training mentors of the general surgery residency of a faculty of medicine in Salvador, Bahia – 2018

No.	Recommendations	Total points (Likert)	Totally agree % (n)	Partially agree % (n)	Partially disagree % (n)	Totally disagree % (n)
1	Do not request a CT scan to assess suspected acute appendicitis in children before considering ultrasonography	40	100.0 (10)	0 (0)	0 (0)	0 (0)
2	Do not prescribe antibiotic prophylaxis for surgical patients beyond the recommended time	40	100.0 (10)	0 (0)	0 (0)	0 (0)
3	Do not request CT scans of multiple body segments for patients with low-grade trauma and no clear signs in physical examination	40	100.0 (10)	0 (0)	0 (0)	0 (0)
4	Do not recommend preoperative eight-hour fasting for solids and liquids in all surgeries	39	90.0 (9)	10.0 (1)	0 (0)	0 (0)
5	Carefully evaluate before requesting an upper gastro-intestinal (GI) endoscopy for surgical patients with no clinical evidence or alarm signs of peptic and gastro-oesophageal reflux disease	39	90.0 (9)	10.0 (1)	0 (0)	0 (0)
6	Carefully evaluate before prescribing post-surgical prophylaxis with broad spectrum antibiotics	39	90.0 (9)	10.0 (1)	0 (0)	0 (0)
7	Do not request a chest X-ray and electrocardiogram as preoperative tests in low–risk surgeries for patients with normal physical examination	37	80.0 (8)	10.0 (1)	10.0 (1)	0 (0)
8	Do not randomly request imaging tests for patients with jaundice without considering well established clinical criteria	36	70.0 (7)	20.0 (2)	10.0 (1)	0 (0)
9	Do not prescribe proton-pump inhibitors for surgical patients with no risk factors	36	70.0 (7)	20.0 (2)	10.0 (1)	0 (0)
10	Reflita antes de indicar colonoscopia, por período inferior a dez anos, para triagem de cancro colorretal em pacientes de baixo risco e sem histórico familiar	36	60.0 (6)	40.0 (4)	0 (0)	0 (0)
11	Carefully evaluate before requesting laparoscopic cholecystectomy for patients with asymptomatic cholelithiasis	35	60.0 (6)	30.0 (3)	10.0 (1)	0 (0)
12	Do not request magnetic resonance cholangiopancreatography (MRCP) for patients with ultrasound imaging data indicating an endoscopic retrograde cholangiopancreatography (ERCP)	34	50.0 (5)	40.0 (4)	10.0 (1)	0 (0)
13	Do not request pelvic magnetic resonance imaging for cancer diagnosis in patients with adnexal mass confirmed by pelvic ultrasound Doppler imaging and positive tumour markers	26	30.0 (3)	20.0 (2)	30.0 (3)	20.0 (2)

n: number of registrars
Source: author's database

DISCUSSION

Research on training in quality healthcare promoting conscious choices suggests that changes should be initiated throughout the medical course, in a learning environment focused on reflective and evidence-based practice.[3,14] A list of five recommendations was developed within the scope of this study, addressing clinical practices that should be carried out upon consideration of the risk-benefit ratio they represent for the patients, combined with a training programme. The recommendations will be described individually and based on the evidence found in literature.

The first recommendation – 'Do not request a CT scan

Table 2 – Assessment of Choosing Wisely Programme training action involving 98 registrar physicians attending the general surgery residency in Salvador, Bahia – 2018

Item	Excellent n (%)	Very good n (%)	Good n (%)	Regular n (%)	Bad n (%)
Content of CW campaign	63 (64.3)	31 (31.6)	3 (3.1)	1 (1.0)	-
Quality of presentation	61 (62.3)	35 (35.7)	2 (2.0)	-	-
Quality of discussion	63 (64.3)	29 (29.6)	5 (5.1)	1 (1.0)	-

n: number of registrars
Source: author's database

Table 3 – Responses to the recommendations of CW programme used in the theoretical assessment of the general surgery residency in Salvador, Bahia – 2018

Recommendations	Correct response n (%)	Partial or total error n (%)
Do not request a CT-scan to assess a suspected acute appendicitis in children before considering ultrasonography	97 (99.0)	1 (1.0)
Do not request a CT-scan of 'different body segments' for patients with low-grade trauma and with no clear signs in physical examination	94 (95.9)	4 (4.1)

n: number of registrars
Source: author's database

to assess suspected acute appendicitis in children before considering ultrasonography' - is explained by the fact that acute appendicitis is considered as the leading cause of surgical acute abdomen in children and that it is usually diagnosed based on the patient's clinical history and physical examination, in addition to ultrasonography. Although it is an operator-dependent examination, it is a non-invasive technique, with 71 - 94% sensitivity and 81% - 98% specificity and is reliable for diagnostic confirmation. Other imaging tests could be obtained when in doubt, including computed tomography (CT) (76 - 100% sensitivity and 83 - 100% specificity).[15,16]

There has been in recent years an increasing concern about the overuse of CT, given the significance of the effects of radiation exposure and higher risk of cancer, especially in children.[16,17] A study involving 44,529 inpatients under the age of 18 due to acute appendicitis showed an increasing use of CT imaging from 3% of cases in 2003 to 20% in 2012.[16] However, these figures may decrease in institutions where evidence-based protocols are in place. A US multidisciplinary study by Russel *et al.*[15] showed a 41% decrease in CT imaging tests after the implementation of clinical guidelines focused on the clinical picture, use of ultrasound as initial imaging test and early involvement of surgeons, with no variation in negative appendectomy rate.

The second recommendation – 'Do not prescribe antibiotic prophylaxis for surgical patients beyond the recommended time' - is explained by the fact that surgical infections are the third leading cause of nosocomial infection, affecting 14% - 16% of inpatients. In surgical patients, postoperative infection is the most common cause of nosocomial infection, accounting for 77% of deaths. The mortality rate doubles in patients who develop infection when compared to patients undergoing the same procedures without infection.[18,19]

A meta-analysis by Bowater *et al.*[20] involving 43,809 patients in 256 clinical trials published between 1990 and 2006 found that antibiotic prophylaxis is an effective preventive measure and prevents the development of infections caused by microorganisms that colonise or contaminate the surgical field. The appropriate use of surgical prophylaxis may reduce the infection rate by up to 50%, also leading to a decrease in adverse effects and the selection of resistant bacterial strains.[19,21]

The third recommendation – 'Do not request CT scans of multiple body segment' - is explained by the overuse of CT in the context of unintentional injuries and trauma, based on the premise that it reduces the mortality rate. The American College of Surgeons Committee on Trauma (ACS COT) recommends a staged imaging study, starting with conventional X-ray testing, ultrasound, followed by CT.[22] Therefore, the indication for CT of a specific body segment in patients with low-grade trauma should be based on clinical history and physical examination, avoiding radiation exposure and impact on the mortality rate, and reducing healthcare costs.[22,23]

Unintentional injuries represent the leading cause of death under the age of 45, accounting for 10% of global mortality. In this context, the use of CT imaging spreads rapidly and is often requested inappropriately.[22,23] A systematic review of studies published between 2003 and 2013, carried out by Treskes *et al.*[24] and aimed at the assessment of the indication of whole-body CT imaging in trauma settings, recommended the need for specific criteria for its indication, including the presence of abnormal vital signs in the face of multiple injuries, severe injuries and high degree of severity, as well as the presence of poor outcomes after initial imaging. There is no consensus regarding its indication, although it should be avoided in mild trauma.

The fourth recommendation – 'Do not recommend

preoperative eight-hour fasting for solids and liquids in all surgeries' - is explained by the fact that several metabolic abnormalities usually develop upon surgeries with prolonged fasting, including decreased insulin levels, increased glucagon and insulin resistance leading to increased cortisol secretion and metabolic stress. When fasting is associated with the response to surgical trauma, an increase in energy consumption appears, causing rapid malnutrition and delayed healing.[25,26]

The American Society of Anesthesiologists (ASA) recommends the possible reduction of preoperative fasting time in most surgeries with the administration of a carbohydrate-enriched solution or clear liquids up to two hours before. This recommendation is safe and unrelated to the risk of aspiration, regurgitation or mortality and is one of the most beneficial factors in reducing organ response, surgical stress and improving patient well-being. Decisions regarding fasting time may be individualised and specific situations should be taken into consideration.[26]

A Brazilian study involving 3,715 patients found a median 12-hour preoperative fasting time, which was longer (median of 13 hours) in hospitals following a conventional protocol with a recommended fasting period of six to eight hours for solids and liquids, when compared to hospitals adopting the most recent clinical guidelines with 6 to 8-hour fasting periods for solids and two to four hours for clear or carbohydrate-fortified liquids (median of eight hours). It is worth mentioning that the actual preoperative fasting time in Brazilian hospitals is significantly longer than the recommended time.[27]

The fifth recommendation - 'Carefully evaluate before requesting an upper gastro-intestinal (GI) endoscopy for surgical patients with no clinical evidence or alarm signs of peptic and gastro-oesophageal reflux disease' - is explained by the fact that GI endoscopy is only indicated for surgical patients in specific situations and according to specific clinical criteria including (i) presence of dyspepsia and gastro-oesophageal reflux, (ii) bleeding, (iii) dysphagia, (iv) persistent vomiting, (v) intraoperative assessment and (vi) management of operative adverse events.[28] Even though it is widely used, GI endoscopy involves a certain risk of complications and is not indicated in most surgical cases, especially when the expected results will not contribute to modify the therapeutic approach.[28,29]

After drawing up the list of recommendations, the training action was started. The implementation of the CW campaign was based on different moments of discussion, interaction and reflection among the participants on a topic that is not usually included in curricula.[10] There was an active participation and involvement of registrars in CW throughout the training action, increasing their knowledge and stimulating a reflective process regarding cost-conscious attitudes towards medical care. The good results found in the evaluation of the training action showed that the methodology adopted was adequate to the awareness raising campaign.

The integration of the subject in face-to-face, theoretical and practical activities was another way to consolidate the contents of the campaign. The theoretical contents of the programme took into consideration healthcare costs, regardless of whether or not they are on the list of CW recommendations. Changes towards more reflective thinking was found by mentors, even though it was not quantified during the training. The disclosure of the campaign through the media and banners have also contributed to the presentation of this subject throughout the residency, improving reading and knowledge maintenance. These training actions can therefore improve an evidence-based medical practice and reduce the adoption of conducts that involve unnecessary risks for the patients.

The theoretical contents of the CW programme and knowledge on the recommendations were supported by the successful outcomes of the theoretical evaluation carried out at the end of the training (> 95%). The theme of the campaign was approached with clinical scenarios requiring not only reasoning but also cost-conscious selection of the most appropriate procedures from the point of view of the relationship between healthcare costs and benefits for the patients. The reasons underlying the selection of the two recommendations used in the theoretical evaluation were related to the overuse and lack of criteria in the choice of imaging exams in surgery, especially regarding the use of CT scan.

Clinical practice aimed at reducing approaches with unnecessary risks for the patients can be developed during training, provided that mentors and registrars are involved in the medical education environment as well as in the promotion of good practices in this area. Although the involvement of medical students was recommended in the CW campaign, the adoption of this initiative was up to now developed in a few countries throughout the medical course.[3,10] In Canada, the CW campaign has been integrated into medical school, involving students not only in the development of lists of recommendations regarding the use of diagnostic tests or other procedures, but also improving a cost-conscious culture in the university itself.[10]

The Students and Trainees Advocating for Resource Stewardship (STARS) programme, initially developed in Canada, has become an international movement and is now present in other countries, such as the United States, the Netherlands and Japan. This programme, unlike the CW campaign, which mainly involves medical societies and patients, aims to change the culture of medical education by stimulating student awareness, through leadership, resource management during medical school, addressing

healthcare based on value and patient safety. Training from the start of the medical course can be essential for future decision-making in medical practice.[10,30]

During residency, the professional environment can play an important role in raising awareness of the high costs of healthcare, which may be reflected in a more sensitive and careful behaviour in clinical practice. However, this training is still scarce, as found in a US study of 261 training programmes, in which only 14.9% had training in high value care.[31] In a study involving 456 physicians who completed their specialty residency between 2003 and 2013, Ryskina *et al.* found that only 23.6% of registrars had training in high value care and only 43.8% described being prepared to adopt clinical practice guidelines on high value care.[32]

The implementation of the CW programme throughout the medical course and during residency leads to changes towards improved quality of care in clinical practice. As these initiatives are developed, physicians will become more familiar with the principles of 'high value care' and will certainly adopt cost-conscious clinical decisions and more focused on patient safety.[3,10]

CONCLUSION

The implementation of the CW programme in general surgery residency allowed the acquisition of knowledge and reflective discussion on the campaign recommendations regarding interventions often found in clinical practice with no benefits and with potential unnecessary risks for the patients, as well as aimed at high value care.

Clinical performance has been improved with CW campaign training sessions as reflected in the good assessment results. These also showed that the methodology adopted was considered adequate to the awareness raising proposal. This is a pioneer study in Brazil that can contribute to improve high value care.

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HUMAN AND ANIMAL PROTECTION

The authors declare that this project complied with the regulations that were established by the Ethics and Clinical Research Committee, according to the 2013 update of the 466/12 Resolution of the Helsinki Declaration of the World Medical Association.

DATA CONFIDENTIALITY

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in writing this manuscript.

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