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Proactive care programs in the emergency department: effectiveness and feasibility

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CHAPTER 3

Routine alcohol screening in the emergency department: unscreened patients have an increased risk for hazardous alcohol use

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ABSTRACT

Background

Routine screening programs for hazardous alcohol use in the emergency department (ED) miss large numbers of patients. We investigated whether patient-related or staff-related factors cause screening failures and whether unscreened patients are at increased risk of hazardous alcohol use.

Methods

This is a secondary analysis of a prospective study. From November 2012 until November 2013, all adult patients visiting a Dutch inner-city ED were screened for hazardous alcohol consumption using the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C). Reasons for failure of screening were recorded and were categorised as: (a) patient is unable to cooperate (due to illness or pain, decreased consciousness or incomprehension due to intoxication, psychiatric, cognitive or neurological disorder or language barrier), (b) healthcare professional forgot to ask, (c) patient refuses cooperation and (d) screening was recently performed (<6 months ago). Presence of risk factors for hazardous alcohol use was compared between screened and unscreened patients.

Results

Of the 28,019 ED patients, 18,310 (65%) were screened and 9709 (35%) were not. In 7150 patients staff forgot to screen, whereas 2559 patients were not screened due to patient factors (2340 being unable and 219 unwilling). Patients with any of these risk factors were less likely to be screened: male sex, alcohol-related visit, any intoxication, head injury, any kind of wound and major trauma. In multivariate analysis, all these risk factors were independently associated with not being screened. Patients with at least one risk factor for hazardous alcohol use were less likely to be screened. Highest prevalence of risk factors was found in patients unable or unwilling to cooperate.

Conclusion

Patients who do not undergo routine screening for alcohol use at triage in the ED have an increased risk for hazardous alcohol use. These data highlight the importance of screening patients, especially those initially unwilling or unable to cooperate, at a later stage.

INTRODUCTION

Hazardous alcohol use is one of the most important risk factors for increased morbidity and premature mortality worldwide. Beyond health consequences, alcohol abuse causes significant social and economic losses for individuals and society.[1–3] Given the rate of injuries and health problems that are due to hazardous alcohol use, the emergency department (ED) is a common portal of entry into the healthcare system for many of these patients.

To reduce alcohol-attributable harm, a growing number of emergency health services have developed and implemented prevention and treatment programs for patients with hazardous alcohol use.[3] These Screening and Brief Intervention (SBI) programs consist of alcohol screening with a validated instrument, followed by advice or brief intervention for patients who exceed recommended drinking limits. A Cochrane review of studies in general practice, emergency care and other primary care settings found moderate-quality evidence that brief interventions reduce alcohol consumption in hazardous drinkers.[4] Results of a large meta-analysis of randomized controlled trials in emergency care settings generally favoured brief interventions above no intervention or standard care, although the observed effects were small.[5]

In 2017 we published a study, called the Screening and brief InteRvention for hazardous alcohol use in an inner-city Emergency department in the Netherlands (SIREN) study, in which routine screening for hazardous alcohol use was performed in all adult patients who visited the ED, using the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C). Male sex, an alcohol-related reason for the ED visit, any intoxication (including but not limited to alcohol intoxication), head injury, gastrointestinal bleeding and any kind of wound were significant predictors for a positive AUDIT-C score.[6]

A considerable number of ED patients in the SIREN study were not screened, a limitation found in other studies and reflecting how challenging the implementation of routine screening for hazardous alcohol use is in a busy ED.[7–9] It is unknown which patients fail to undergo screening and in particular whether these patients are at increased risk of hazardous alcohol use. Screening failure may leave possible hazardous drinkers undetected, which undermines the impact and success of routine screening for hazardous alcohol use.

We aimed to investigate which patient-related or staff-related factors were associated with screening failures using data from the SIREN study. Moreover, we aimed to determine the presence of risk factors for hazardous alcohol use in both screened and unscreened ED patients.

METHODS

Study design and setting

The SIREN study was performed from November 2012 to November 2013 in the ED of Haaglanden Medical Centre Westeinde (HMC Westeinde).[6] The HMC Westeinde is an inner-city general hospital and level I trauma centre in the Netherlands, with 50,000 ED visits annually. During implementation, all ED healthcare professionals (nurses, medical doctors and nurse practitioners) received a standardized training that included education in techniques of motivational interviewing. Screening, Brief Intervention and Referral to Treatment (SBIRT)[10] was adopted as a standard approach in the ED.

Study population

All consecutive patients, both arriving by ambulance and ambulatory, aged 18 years and older visiting the ED were eligible for screening for hazardous alcohol use.

Study procedures

Screening took place during triage (a brief, focused assessment after entering the ED, in which the urgency of the complaints is established)[11] and was performed 24 hours a day, 7 days a week. Prior to screening, the triage nurse indicated whether the patient's ED visit was certainly or possibly alcohol-related and recorded this in the patient's file. An ED visit was designated as alcohol-related if the patient's presenting problem was either a direct result of alcohol use shortly before presentation or due to effects of longer term excessive alcohol use. Thereafter, screening was performed using the AUDIT-C. The AUDIT-C is a short form of the AUDIT, limited to consumption questions, and is validated for ED settings.[12] The aim of the screening was to detect patients with hazardous alcohol use in order to offer them a brief intervention and/or further treatment, independently of the relationship between their alcohol use and the reason for the ED visit. We therefore decided to use the AUDIT-C, because it performs well in screening for high-volume drinking, alcohol-related social problems and dependence.[12] An AUDIT-C score of 5 and higher was considered to be a positive result in men and an AUDIT-C score of 4 or more indicated a positive result in women.[12] The screening questions were incorporated in the hospital electronic system. Nurses were not able to complete and close the patient's file if the AUDIT-C score or reason for not screening was not filled in. Reasons for not screening were noted as follows: (a) patient is not capable of answering (e.g., due to severe illness or pain, decrease in consciousness or incomprehension of the screening questions due to a neurological, cognitive or psychiatric disorder, intoxication or language barrier), (b) healthcare professional forgot to ask, (c) patient refuses cooperation (in case the patient indicated he or she was not willing to answer the screening questions) and (d) screening has been performed recently (during a former visit to the HMC Westeinde ED but less than 6 months ago). Being not capable of answering and

refusal of cooperation were defined as patient-related factors for not screening, whereas forgotten by healthcare professional was defined as staff-related factor for not screening. Patients who were recently screened, according to the protocol, were excluded from this study.

Brief interventions were not performed during triage, but at a later stage during the patient's stay in the ED by one of the healthcare professionals, trained in techniques of motivational interviewing.

Measurements

To identify patient and ED visit characteristics of both screened and unscreened patients, the following data were extracted from the hospital's database for each registered patient: age, sex, presenting problem, triage level, whether or not the ED visit was alcohol-related according to the triage nurse, living district, day and time of ED visit. Presenting problems as defined by the Manchester Triage System were identified from the triage notes for each ED visit.[11] Comparable presenting problems were merged into one main category. Like in other studies,[10,13] we merged the presenting problems "head injury" and "major trauma", "fall from height" and "trunk injury" into a single category, as these were all due to trauma; we also analysed the prevalence of head injury separately. The category "any kind of wound" was analysed separately from the "trauma" category, as wounds could also have a non-traumatic cause. Triage levels were assigned according to the five-level Manchester Triage System.[11]

Outcomes of interest

Outcome measures describe the differences in patient characteristics between patients who were screened for hazardous alcohol use and patients who were not screened, due to patient-related and staff-related factors, using numbers, percentages and odds ratios. Risk factors for hazardous alcohol use that were independently associated with not being screened in multivariate analysis were presented in adjusted odds ratios and their 95% confidence intervals and p-values.

Data analysis

For patients with multiple ED visits during the 1-year study period, only data from the first ED visit were included for analyses (Figure 1). Data from the SIREN study were entered in SPSS, version 20. To assess associations between patient characteristics, presenting problems, specific ED-related circumstances and whether or not patients were screened by ED staff, cases were split into patients who received screening and those who did not. Unscreened patients were divided into two groups: patients who were not screened due to patient-related factors and patients who were not screened as a result of staff-related factors. Patient-related factors were (a) being unable or (b)

being unwilling to cooperate with screening. Staff-related factors were situations in which the nurse indicated that screening was forgotten.

Data were tabulated and differences between groups were analysed using $\chi 2$ tests. Numerical data were compared using Mann-Whitney U tests. Statistical significance was set at a p-value ≤ 0.05, and odds ratios (ORs) were calculated.

In a subsequent analysis, we compared the number of patients with one or more risk factors between screened patients and patients not screened due to patient-related factors (unable and unwilling to cooperate), between screened patients and patients not screened due to staff-related factors and between screened patients and the total group of unscreened patients. The factors that were found to be predictors for a positive AUDIT-C score in the SIREN study (male sex, an alcohol-related reason for the ED visit, any intoxication (including but not limited to alcohol intoxication), head injury, gastrointestinal bleeding and any kind of wound) were defined as risk factors for hazardous alcohol use in this study.[6] Although the category "major trauma, fall from height and trunk injury" was not independently associated with hazardous alcohol use in the SIREN study, major trauma was found to be associated with hazardous alcohol use in several other studies.[10,13] Therefore, we considered major trauma as a risk factor as well. Results are presented in numbers, percentages and ORs with their 95% confidence intervals (CI).

All factors associated with hazardous alcohol use that were significantly more common in unscreened than in screened patients in univariate analysis, were entered into a multivariate logistic regression model, using binary logistic regression. Being screened was chosen as dependent variable whereas risk factors were entered as covariates. Adjusted ORs and their 95% CIs were calculated.

Patient and public involvement

Patients were not involved in setting up or conduct of the study. After 3 months, all patients with a positive AUDIT-C score received a telephone interview, including an assessment of the burden of the study.

RESULTS

During the 1-year study period, 28,019 consecutive adult patients made a total of 41,900 ED visits. A total of 6869 patients (20%) had one or more ED return visits during the study period. Of the 28,019 patients, ED staff screened 18,310 (65%) patients for hazardous alcohol use and 9709 (35%) patients were not screened (Figure 1). Compared with screened patients, unscreened patients were more often men (OR 0.8 (95% CI: 0.8-0.8) and they were slightly older (42 vs. 41 years of age) (both p<0.001). Unscreened patients were more likely to be high urgency patients (translated into a red or orange triage colour) or non-urgent patients (blue triage colour) than screened patients (Table 1).

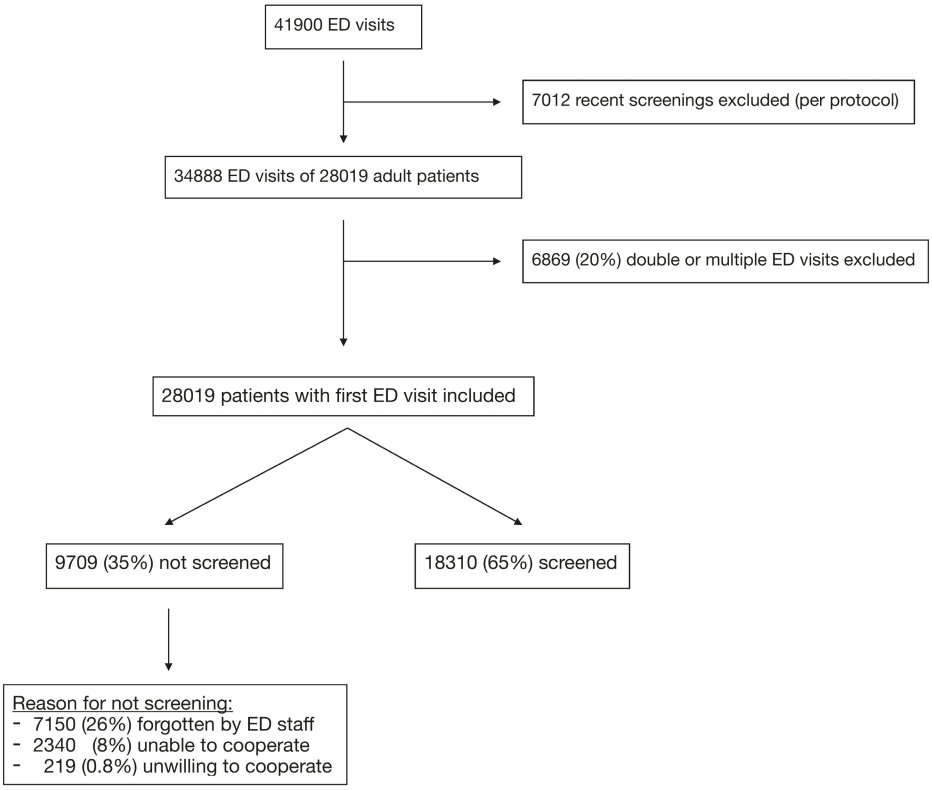

Figure 1. Flow chart showing the number of ED visits by actual number of adult patients visiting the ED during the 1-year study period. Only the first visit of each patient during the study period was included for analysis. Recently screened patient were excluded. Reasons for not screening are indicated.
ED, emergency department

Table 1. Comparison of sex, age, triage category (colour) and prevalence of factors associated with hazardous alcohol use (expressed in numbers and percentages) in patients visiting the ED, stratified for patients screened and patients not screened. Unscreened patients are divided into not being screened for patient-related or for staff-related factors.

	Screened (N=18310)	**Unscreened** (N=9709)				**Odds Ratio (95%CI)**^
		Patient-related (N=2559)		Staff-related (N=7150)	Total (N=9709)	
		Unable N=2340	Unwilling N=219			
Male sex, n (%)	8918 (49)	1281 (55)	149 (68)	3859 (54)	5289 (54)	0.8 (0.8-0.8)
Median age in years (range)	41 (18-99)				42 (18-104)	
Triage category (colour)						
Immediate (red) (%)	24 (0.1)	171 (7.3)	2 (0.9)	42 (0.6)	215 (2.2)	0.06 (0.04-0.09)
Very urgent (orange) (%)	2444 (13)	795 (34)	38 (17)	997 (14)	1830 (19)	0.7 (0.6-0.7)
Urgent (yellow) (%)	6737 (37)	810 (35)	101 (46)	2229 (31)	3140 (32)	1.2 (1.2-1.3)
Standard (green) (%)	8637 (47)	466 (20)	70 (32)	3245 (45)	3781 (39)	1.4 (1.3-1.5)
Non-urgent (blue) (%)	128 (0.7)	11 (0.5)	4 (1.8)	101 (1.4)	116 (1.2)	0.6 (0.5-0.7)
Triage colour unknown (%)	340 (1.9)	87 (3.7)	4 (1.8)	536 (7.5)	627 (6.5)	0.2 (0.2-0.3)
Risk factors for hazardous alcohol use:						
Alcohol related visit:						
Yes/possibly (%)	637 (3.5)	489 (21)	104 (47)	352 (4.9)	945 (9.7)	0.3 (0.3-0.4)
No (%)	17637 (96)	1851 (79)	115 (53)	6798 (95)	8764 (90)	2.8 (2.6-3.1)
Presenting problem:						
Any intoxication (%)*	131 (0.7)	205 (8.8)	28 (13)	66 (0.9)	299 (3.1)	0.2 (0.2-0.3)
Gastrointestinal bleeding (%)	150 (0.8)	21 (9.0)	0 (0)	48 (0.7)	69 (0.7)	1.2 (0.9-1.5)
Any kind of wound (%)	1269 (6.9)	126 (5.4)	28 (13)	826 (12)	980 (10)	0.7 (0.6-0.7)
Trauma:	681 (3.7)	242 (10)	36 (16)	391 (5.5)	669 (6.9)	0.5 (0.5-0.6)
Head injury (%)	*332 (1.8)*	*74 (3.2)*	*20 (9.1)*	*143 (2.0)*	*237 (2.4)*	0.7 (0.6-0.9)
Major trauma, fall from height, trunk injury (%)	*349 (1.9)*	*168 (7.2)*	*16 (7.3)*	*248 (3.5)*	*432 (4.5)*	0.4 (0.4-0.5)
Other presenting problems (%)**	16079 (88)	1746 (75)	127 (58)	5819 (82)	7692 (79)	1.9 (1.8-2.0)

^ Comparing all screened with all unscreened patients

* including “overdose and poisoning” and “alcohol intoxication”

**Other presenting problems (not associated with hazardous alcohol use) are: abdominal pain, diarrhoea, vomiting, abnormal behaviour, psychiatric illness, auto mutilation, back pain, neck pain, burns, chemical injury, (near) collapse, diabetes, haematological disease, dyspnoea, asthma, ear, eye, nose, teeth and throat complaints, headache, limb complaints, physical abuse, pregnancy related problems, seizure, skin rash, bite wounds, insect bites, infection, abscess, rectal problems, thoracic pain, urinary tract complaints, vaginal bleeding, venereal disease, questions about medication, other complaints.

ED, emergency department; *N*, number; *CI*, confidence interval.

Patients with an ED visit that was designated as alcohol-related by the triage nurse were less likely to be screened (OR 0.3; 95% CI 0.3-0.4). Apart from gastrointestinal bleeding (OR 1.2; 95% CI 0.9-1.5), all factors associated with hazardous alcohol use were significantly more common in unscreened than in screened patients (Table 1).

Table 2 shows that screened patients were less likely to have at least one risk factor for hazardous alcohol use compared with unscreened patients (OR 0.7 (95% CI 0.7-0.7) and p<0.001).

Table 2. Screened patients with at least one risk factor for hazardous alcohol use, compared to unscreened patients with at least one risk factor, stratified by patient-related and staff-related factors for not screening

	Screened (N=18310)	**Unscreened** (N=9709)			
		Patient-related (N=2559)		Staff-related (N=7150)	Total (N=9709)
		Unable N=2340	Unwilling N=219		
Patients with ≥1 risk factor (N=16084), N (%)	9947 (62)	1545 (10)	182 (1)	4410 (27)	6137 (38)
OR (95% CI)*		0.6 (0.6-0.7)	0.2 (0.2-0.3)	0.7 (0.7-0.8)	0.7 (0.7-0.7)

All comparisons *p*<0.001.
* ORs per column represent the comparison between screened patients and the group of unscreened patients in that column
N, number; *OR*, Odds Ratio; *CI*, confidence interval.

Compared with each subgroup of unscreened patients (not screened due to patient-related and staff-related factors), screened patients were more likely to have no risk factors for hazardous alcohol use than patients in each of these subgroups. Especially patients who were unwilling to be screened were likely to have one or more risk factors.

In multivariate analysis, all factors associated with hazardous alcohol use, except gastrointestinal bleeding, were significant predictors for failure to undergo routine alcohol screening (Table 3).

Table 3. Risk factors for hazardous alcohol use that are independently associated with being screened for hazardous alcohol use in routine ED care

	Exp (*B*)	95% CI	P-value
Male sex	0.8	0.8-0.9	<0.001
Alcohol-related visit according to triage nurse	0.5	0.4-0.5	<0.001
Any intoxication	0.3	0.3-0.4	<0.001
Any kind of wound	0.7	0.6-0.7	<0.001
Head injury	0.8	0.7-1.0	0.015
Major trauma, fall from height, trunk injury	0.4	0.4-0.5	<0.001

ED, emergency department; *CI*, confidence interval.

DISCUSSION

Using data from the SIREN study, we determined which patient-related or staff-related factors were associated with missed opportunities for alcohol screening and examined the presence of risk factors for hazardous alcohol use in both screened and unscreened ED patients. We found that in the 9709 (35%) patients who were not screened, staff forgot to screen in 7150 patients, whereas 2559 patients were not screened due to patient-related factors (2340 being unable and 219 unwilling to cooperate). ED patients who failed to undergo routine alcohol screening had an unfavourable risk profile for hazardous alcohol use compared with patients who were screened, especially those patients who were not screened due to inability or unwillingness to cooperate. This suggests that patients who are most likely to benefit from screening are not reached. This is an important finding as resources spent on SBIRT programs may be misdirected to patients who are not (most) in need.

It is not clear from our data why patients were unable or unwilling to cooperate with screening during triage. It is unknown whether these patients would be receptive to brief intervention and whether putting extra effort in reaching these patients for screening and intervention would improve the effectiveness of routine screening for hazardous alcohol use. Hence, more research focused on this specific group of unscreened patients is needed, especially given the high incidence of risk factors for hazardous alcohol use in this group. If these (unscreened) patients would indeed benefit from SBIRT programs, it could explain the observed low levels of improvement of SBIRT programs in prior studies [14], as these patients were not included.

We found triage a suitable moment for alcohol screening as hazardous alcohol use can play an important role in multiple presentations and diseases and can interact with medications that may be necessary to administer.[14] It is therefore desirable to be aware of the patient's alcohol consumption shortly after the patient has entered the ED. However, to reach patients for screening who are unable or unwilling to cooperate

when entering the ED, an approach could be to perform screening at a later stage than triage, for example, later during their stay in the ED or during hospitalisation. This offers the opportunity to plan a suitable moment for screening. It is likely that patients who did not present to the ED to seek help or advice for their drinking problems are more willing to cooperate with screening after being treated for their presenting problem than during the triage process.[14] Implementing a standing order in the hospital's electronic system that requires screening to be completed at a certain end point (e.g., discharge from the hospital) would be necessary in order not to forget the screening.[15] In our study, 24% of the patients who were not screened were admitted to the hospital (compared to 17% of screened patients), which means that there is an opportunity to screen a significant number of unscreened patients at a later moment while they are still under the care of hospital staff. Although it is preferable to perform the screening and brief intervention during the patient's ED visit, when the patient may be most receptive to intervention,[16],[17] other healthcare providers, most suitably the general practitioner, could also perform screening and intervention after discharge from the ED. A report of the ED visit could be sent to the general practitioner to facilitate this.

In our study, staff-related factors that resulted in forgetting or leaving out screening were the most common reasons why screening was not performed. Studies describing the implementation process of SBIRT in the ED indicate that ED staff experience several barriers in performing SBIRT. The most common barriers they mention are time pressure, competing priorities and the need to focus on more medically urgent issues. Besides that, the uncomfortable nature of the topic, not feeling competent enough to discuss the topic with the patient, lack of privacy and fear for a negative response of the patient are also mentioned as barriers. Doubt regarding treatment efficacy and patient adherence and the feeling that discussing alcohol use with the patient is not their responsibility were further reasons for low staff motivation and for leaving out screening.[18],[8],[19] During focus group discussions with our ED staff, we identified similar barriers for screening (unpublished data). Although implementation studies suggest multiple interventions to optimise screening, the barriers they report reflect how challenging successful implementation of routine screening for hazardous alcohol use is in a busy ED.

Given the reported overall small effect of brief interventions [4],[5] and the generally reported high number of missed patients when screening the entire ED population,[7],[8],[9] it would be worth considering targeting the screening on patients presenting with factors associated with hazardous alcohol use. Studies performing SBIRT according to this approach reported a lower number of unscreened patients. [20],[21] Adopting narrower screening criteria may decrease costs and increase specificity, especially when the occurrence of hazardous alcohol use in the total ED patient population is low.[6–8],[22]

Limitations

There are several limitations to this study. The AUDIT-C was used as screening tool. The AUDIT-C is a shortened variant of the AUDIT. By using the shortened variant, useful information about alcohol-related health problems may have been omitted. However, the AUDIT-C performs well in screening for high-volume drinking, alcohol-related social problems and dependence and is validated for ED settings. It is limited to consumption questions, which contribute most to the full AUDIT.[12],[23],[24]

Moreover, factors that were previously shown to be associated with hazardous alcohol use in the screened population of the SIREN study were used to assess whether the unscreened population of the study could be at increased risk for hazardous alcohol use. As of yet, these risk factors for an increased AUDIT-C score in ED patients require confirmation in a separate study. Nevertheless, several of these factors, including alcohol-related ED visit, male sex, trauma and gastrointestinal bleeding are widely considered to be risk factors for hazardous alcohol use.[10],[13],[25],[26]

In addition, the study was performed in an inner-city, non-academic general hospital, situated in an urban, low-socioeconomic environment with many immigrants, that serves as a regional trauma and neurology centre. Therefore, extrapolating these results to other populations should be done with caution.

In conclusion, ED patients who did not to undergo routine alcohol screening had higher risk for hazardous alcohol use than screened patients. Risk factors for hazardous alcohol use were most common in patients unwilling or unable to cooperate with screening. Using narrower screening criteria and screening patients later during their stay in the ED or during hospital admission may lead to better screening and brief intervention results directed at those patients most in need.

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