

# Effectiveness of brief intervention and contact for suicide attempters: a randomized controlled trial in five countries

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**Objective** To determine whether brief intervention and contact is effective in reducing subsequent suicide mortality among suicide attempters in low and middle-income countries.

**Methods** Suicide attempters ( $n = 1867$ ) identified by medical staff in the emergency units of eight collaborating hospitals in five culturally different sites (Campinas, Brazil; Chennai, India; Colombo, Sri Lanka; Karaj, Islamic Republic of Iran; and Yuncheng, China) participated, from January 2002 to October 2005, in a randomized controlled trial to receive either treatment as usual, or treatment as usual plus brief intervention and contact (BIC), which included patient education and follow-up. Overall, 91% completed the study. The primary study outcome measurement was death from suicide at 18-month follow-up.

**Findings** Significantly fewer deaths from suicide occurred in the BIC than in the treatment-as-usual group (0.2% versus 2.2%, respectively;  $\chi^2 = 13.83$ ,  $P < 0.001$ ).

**Conclusion** This low-cost brief intervention may be an important part of suicide prevention programmes for underresourced low- and middle-income countries.

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Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

## Introduction

Suicide is a preventable cause of death. After about two centuries of research in suicide prevention, the effectiveness of a number of interventions has been demonstrated and various risk factors have been placed in perspective. Thus, “it is no longer acceptable to state blandly that there is no convincing evidence for the effectiveness of suicide prevention measures...” and, even more importantly, “... the unacceptable rate of suicide worldwide can be reduced.”<sup>1</sup>

WHO estimated that 877 000 deaths were due to suicide in the year 2002,<sup>2</sup> the majority of which (85%) occurred in low- and middle-income countries.<sup>3</sup> Attempted suicide can be up

to 40 times more frequent than completed suicide.<sup>4,5</sup> Many of those who attempt suicide require medical attention and they are at high risk for completed suicide.<sup>6–8</sup> Self-inflicted injuries represented 1.4% of the global burden of disease in 2002<sup>2</sup> and are expected to increase to 2.4% by 2020. As suicide is among the top three causes of death in the population aged 15–34 years,<sup>9</sup> there is a massive loss to societies of young people in their productive years of life. Suicide mortality statistics are available at: [http://www.who.int/mental\\_health/prevention/suicide/country\\_reports/en/index.html](http://www.who.int/mental_health/prevention/suicide/country_reports/en/index.html).

There have been several recent reviews of interventions that may be considered effective in reducing

suicides.<sup>1,10–12</sup> Under the framework of universal, selective, and indicated interventions,<sup>13</sup> the general population is targeted by universal interventions (e.g. restricting access to means of suicide) and selective interventions focus on high-risk subgroups (e.g. people with mental disorders), whereas those who have attempted suicide are considered high-risk individuals and are therefore addressed with indicated interventions, which include a range of behavioural therapies and approaches such as cognitive therapy.<sup>14</sup>

Among indicated interventions, various approaches have been tested to prevent subsequent suicidal behaviour by suicide attempters; extensive review articles are available.<sup>15,16</sup> Usually, the

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primary outcome measure used for these interventions was repeated suicide attempts. It is suggested that extrapolation from attempted to completed suicide is valid.<sup>17</sup> As completed suicide is a rare outcome in statistical terms, large numbers of suicide attempters would be needed to demonstrate the effectiveness of an intervention in terms of a reduction of completed suicides. The multisite study presented here tried to tackle this challenge by combining data from different sites that had applied the same research protocol.

Previously, completed suicides were used as an outcome measure in a study that investigated the maintenance of long-term contact (i.e. a total of 5 years and 24 contacts) with high suicide-risk psychiatric patients refusing further treatment.<sup>18–20</sup> The contact comprised regular short letters expressing concern for the person's well-being and inviting them to respond. This was associated with a significant reduction in suicide rates for at least 2 years after discharge from the in-patient setting.

In addition, a "tele-help/tele-check" service (i.e. an alarm system that can be activated to call for help and a service that contacts a person twice a week for assessment of their needs and to provide emotional support) could significantly reduce the number of suicide deaths in the elderly, who typically have an elevated risk of suicide compared with an age-adjusted number for the general population.<sup>21,22</sup>

These two examples demonstrate that it is possible to reduce the suicide rate in populations at risk by keeping in regular contact with patients. Brief interventions for alcohol problems are another promising type of intervention that have not been previously applied to suicidal behaviours.<sup>23–25</sup> These are designed to address the specific behaviour of drinking with information, feedback, health education and practical advice and focus in order to raise awareness of the problem and advise change. They were found to be effective in reducing alcohol-related problems, to be more effective than no counseling, often as effective as more extensive treatment, and feasible within relatively brief contacts. Repeated follow-up visits were recognized as a factor favouring behaviour change and maintenance.

The multisite intervention study on suicidal behaviours (SUPRE-MISS), launched by WHO in 2000, evalu-

ated an innovative intervention in a large randomized controlled trial, that brought together the elements of information, education, and practical advice from brief interventions with the maintenance of long-term follow-up contact on a regular basis. It used completed suicides as the primary outcome measure because the reduction in suicide mortality is the most convincing evidence for the effectiveness of suicide prevention.<sup>26</sup> The multisite randomized controlled trial of different treatment strategies for suicide attempters represented one component of SUPRE-MISS, which, overall, aimed at increasing knowledge about suicidal behaviours and effective interventions for suicide attempters.<sup>27,28</sup> This paper presents the results from the five sites that completed the randomized controlled trial fully according to the protocol.

## Methods

### Enrolment of subjects

Between January 2002 and April 2004, five participating sites (Campinas, Brazil; Chennai, India; Colombo, Sri Lanka; Karaj, Islamic Republic of Iran; and Yuncheng, China) applied the same protocol and recruited a total of 1867 suicide attempters, with an overall drop-out rate of 9% [brief intervention and contact (BIC): 5.4%; treatment as usual (TAU): 12.5%] at the 18-month follow-up time point (Fig. 1). The follow-up period lasted until 31 October 2005.

The suicide attempters were identified by medical staff in one or more emergency care settings within a defined catchment area with a population of at least 250 000. The study tried to include all suicide attempters consecutively seen at the emergency care departments. Inadequate recording of emergency department visits, intentional misreporting of suicide attempts as accidental, failure of the emergency department staff to notify research staff, and rapid departure from the emergency departments of patients made it difficult to include all eligible patients, once medically stable. However, no more than an estimated 5% of cases were lost that way. The rate of refusal of enrolment was 7%. Other reasons for exclusion were death in the ward, clinical conditions not allowing an interview, leaving against medical order, residence in a different catchment area

or language problems. At any rate, the age and sex of the enrolled patients did not differ from those assessed for eligibility.

The research protocol was approved by the relevant ethics committee in each site and all patients enrolled in the randomized controlled trial gave written informed consent. The baseline interviews were conducted face-to-face by trained psychiatrists, medical doctors, psychologists or psychiatric nurses, a maximum of 3 days after the emergency department admission.

### Randomization and sample size

All enrolled participants ( $N = 1867$ ) were randomly assigned to BIC ( $n = 922$ ) or TAU ( $n = 945$ ). An allocation sequence based on a random-number table was used to randomly assign all enrolled subjects to BIC or TAU; the allocation sequence was maintained in a separate location to prevent clinician bias. The subjects were blinded as to their assignment to specific treatment groups. In the consent form, subjects were asked to agree to a follow-up, without specification of the number and time of contacts. This information was given only after subjects had been randomly assigned to their group. Completed suicide was the primary outcome measure applied. For a significance level of 95% (two-sided) and power of 80%, assuming 3% suicides in the TAU and 1% in the BIC group at 18-months follow-up, a total of 1730 subjects was needed.

The TAU modality was carried out according to the norms prevailing in the respective emergency department. At 18 months after discharge, the subjects were followed-up using the same form used by the BIC group. Typically, the treatment provided in the participating sites would not cover routine or systematic psychiatric or psychological assessment or help besides the treatment of somatic symptoms. If there were no complications, the patients were normally discharged after somatic treatment. There was no routine or systematic approach of referral to outpatient facilities or a psychiatric unit.

The BIC treatment modality included, in addition to TAU, a 1-hour individual information session as close to the time of discharge as possible and, after discharge, nine follow-up contacts (phone calls or visits, as appropriate) according to a specific time-line up to

18 months (at 1, 2, 4, 7 and 11 week(s), and 4, 6, 12 and 18 months), conducted by a person with clinical experience (e.g. doctor, nurse, psychologist). The individual information session was conducted according to a written protocol which all sites adhered to. It included information about suicidal behaviour as a sign of psychological and/or social distress, risk and protective factors, basic epidemiology, repetition, alternatives to suicidal behaviours, and referral options. Whenever an interviewer realized that a patient needed more intensive treatment, the relevant referral to help was made, when available and if judged necessary (Fig. 1).

### Instruments

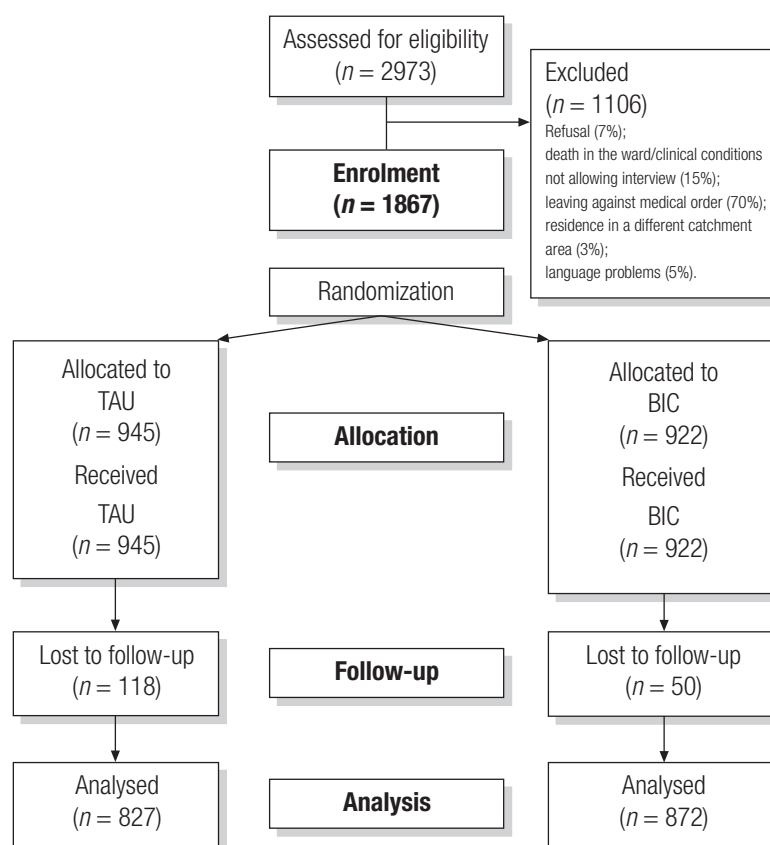
The questionnaire<sup>29</sup> for the comprehensive assessment of all suicide attempters enrolled was commonly applied across all sites, translated into the local language of each site, adapted to take into account cultural specificities, and pilot-tested to assess face and content validity. It was largely based on the European Parasuicide Study Interview Schedule (EPSIS),<sup>30</sup> which had been applied in the WHO/EURO Multi-centre Study on Suicidal Behaviour. It covered sociodemographic items, information about the current suicide attempt, a series of variables on clinical information (e.g. mental and physical health status, traumatic experiences, alcohol and drug use) and included several self-report scales.

For recording follow-up contacts with the patients, a short one-page questionnaire was applied. Questions included whether the patient was still alive; if not, what the cause of death had been (as reported by informants); if yes, whether he/she had committed any further suicide attempts; how the patient felt; whether he/she felt the need for any support and whether he/she had sought support. The protocol is accessible on the web in English, French and Spanish (available at: [http://www.who.int/mental\\_health/resources/suicide/en/index.html](http://www.who.int/mental_health/resources/suicide/en/index.html)).<sup>29</sup>

### Data analysis

In each site, data entry, cleaning, verification and confidentiality were conducted under the direction of the principal investigator. The site-specific data were sent to WHO where they were re-checked and compiled into one

Fig. 1. Flowchart of subjects in the randomized controlled trial: TAU and BIC arms



TAU, treatment as usual; BIC, brief intervention and contact.

database and an overall analysis across all sites was undertaken. The sociodemographic characteristics describe all randomized subjects in the BIC and TAU treatment groups, both when enrolled and when analysed at the 18-month follow-up. Differences in mortality are presented for those analysed at follow-up. Selected variables at baseline were compared to determine any differences between the two treatment groups. Differences in mortality at 18-months were assessed with the  $\chi^2$  statistics at a significance level of 0.05 (two-sided).

## Results

### Drop-out rate

No subjects at all were lost during follow-up in Yuncheng; 3%, 4%, 11%, and 15% were lost at the final follow-up in Campinas, Karaj, Colombo, and Chennai respectively.

### Sociodemographic characteristics

The suicide attempters enrolled were typically female, single, with secondary education and employed (Table 1).

Among the enrolled cases, more than one-third (41% in the TAU; 35% in the BIC group) of the suicide attempters put their life into danger, almost one-quarter (22% in the TAU; 24% in the BIC group) intentionally ingested alcohol or drugs to facilitate and implement the suicide attempt, and about one-fifth (around 20% in both groups) had made a previous suicide attempt. No differences in the sociodemographic variables and items related to the current attempt between the TAU and BIC groups were found among the subjects analysed at the 18-month follow-up, which is crucial to the comparison of the two groups at this time.

### Death during follow-up

More deaths of any cause occurred in the TAU than in the BIC group up to the follow-up at 18 months (Table 2); this difference was significant ( $\chi^2 = 4.360$ ;  $P = 0.037$ ). These included deaths from stroke, cancer, urinary infection, acute respiratory failure, AIDS, liver cirrhosis, old age and suicide.

Table 1. Sociodemographic characteristics of subjects enrolled and analysed at 18-month follow-up

Characteristics	Enrolled N = 1867				P-value <sup>a</sup>	Analysed at 18-month follow-up N = 1699				P-value <sup>a</sup>
	TAU n = 945		BIC n = 922			TAU n = 827		BIC n = 872		
	(n)	(%)	(n)	(%)		(n)	(%)	(n)	(%)	
<b>Age</b>	943	23 years <sup>b</sup>	920	23 years <sup>b</sup>	0.430	826	23 years <sup>b</sup>	870	23 years <sup>b</sup>	0.356
<b>Sex</b>	945		922		0.216	827		872		0.431
Male	410	43.4	370	40.1		352	42.6	354	40.6	
Female	534	56.5	552	59.9		475	57.4	518	59.4	
Transsexual	1	0.1	0.0	0.0		0	0.0	0.0	0.0	
<b>Marital status</b>	941		921		0.921	823		871		0.963
Single	452	48.0	450	48.9		408	49.6	423	48.6	
Married	441	46.9	425	46.1		372	45.2	404	46.4	
Widowed	13	1.4	10	1.1		9	1.1	10	1.1	
Divorced	35	3.7	36	3.9		34	4.1	34	3.9	
<b>Education</b>	944		922		0.185	826		872		0.420
None	87	9.2	77	8.4		68	8.2	69	7.9	
Primary	181	19.2	174	18.9		152	18.4	165	18.9	
Secondary	425	45.0	381	41.3		371	44.9	359	41.2	
Higher (non-uni)	207	21.9	229	24.8		195	23.6	219	25.1	
University	42	4.4	60	6.5		39	4.7	59	6.8	
Other	2	0.2	1	0.1		1	0.1	1	0.1	
<b>Employment</b>	905		892		0.672	790		843		0.224
Full/part-time	381	42.0	403	45.2		321	40.7	384	45.5	
Temporary	49	5.4	50	5.6		47	5.9	48	5.7	
Unemployed	102	11.3	77	8.6		87	11.0	70	8.3	
Disabled	5	0.6	6	0.7		5	0.6	6	0.7	
Retired	7	0.8	5	0.6		7	0.9	4	0.5	
Student	105	11.6	106	11.9		93	11.8	105	12.5	
Armed services	10	1.1	6	0.7		10	1.3	5	0.6	
Housekeeper	220	24.3	212	23.8		199	25.2	194	23.0	
Other	26	2.9	27	3.0		21	2.7	27	3.2	
<b>Consequences</b>	944		922		0.017 <sup>c</sup>	826		872		0.829
None	100	10.6	108	11.7		93	11.3	98	11.2	
No danger to life	457	48.4	495	53.7		429	51.9	465	53.3	
Danger to life	387	41.0	319	34.6		304	36.8	309	35.4	
<b>Alcohol/drug use</b>	910		886		0.391	797		839		0.747
None	609	66.9	585	66.0		518	65.0	551	65.7	
Sufficient <sup>d</sup>	104	11.4	89	10.0		89	11.2	84	10.0	
Intentional <sup>e</sup>	197	21.6	212	23.9		190	23.8	204	24.3	
<b>Previous attempt</b>	945		920		0.281	827		870		0.553
No	755	79.9	716	77.8		656	79.3	679	78.0	
Yes	190	20.1	204	22.2		171	20.7	191	22.0	

TAU, treatment as usual; BIC, brief intervention and contact.

<sup>a</sup> P-value of  $\chi^2$  test.

<sup>b</sup> Value is median age.

<sup>c</sup> Significant at the 5% level (two-sided).

<sup>d</sup> Sufficient for the deterioration of judicious capacity and responsibility.

<sup>e</sup> Intentional intake to facilitate and implement the suicide attempt.

### Death from suicide during follow-up

At the 18-months follow-up (Table 2), significantly more subjects had died from suicide in the TAU group than in the BIC group ( $\chi^2 = 13.83$ ;  $P < 0.001$ ).

### Discussion

For the first time, a large multisite, multicountry research protocol evaluated BIC after attempted suicide in a randomized controlled trial, using deaths from suicide as the primary outcome measure. Our findings demonstrate that a brief information session combined with systematic long-term contacts after discharge can have a positive influence on preventing subsequent deaths from suicide up to 18 months after discharge from emergency departments. The information session included knowledge about suicidal behaviours and about alternative constructive coping strategies regarding treatment and referral possibilities.

We believe that the mechanism of action of BIC is similar to that of psychosocial counselling: it acts as a temporary artificial social support network for people who do not have efficient social support. Many suicidal patients lack good communication and relationships within their family and with other people. BIC increased the awareness of suicide attempters about the problems that led to the suicidal act and helped them to find ways of solving suicidal crises. This enhanced a feeling of connectedness. Also, systematic follow-up contacts gave the patient a feeling of being seen and heard by someone.<sup>31,32</sup>

The study has several limitations, partly due to its purposeful setting in less-resourced countries with a scarcity of infrastructure, financial and human resources. In all these places suicide is an issue just as sensitive as anywhere else.

First, suicide is still a taboo. Up to 75% of those who attempted suicide in the communities of the participating sites did not seek treatment in medical facilities.<sup>27</sup> In some places, those who were treated in emergency settings tended to leave before their case could lead to a police enquiry or be known by the family, neighbours and others. Thus, the rapid departure of subjects from the emergency department proved to be a major obstacle to enrolling them in the study. Due to several reasons, given in the methods

Table 2. Mortality of subjects at 18-month follow-up

Status	TAU N = 827		BIC N = 872		$\chi^2$	P-value
	(n)	(%)	(n)	(%)		
Died of any cause	22	2.7	11	1.3	4.36	0.037
Died by suicide	18	2.2	2	0.2	13.83	< 0.001

TAU, treatment as usual; BIC, brief intervention and contact.

section of this paper, several cases were missed before enrolment.<sup>28</sup> Similarly, the follow-up of subjects proved to be a major challenge in the participating sites which struggled with the infrastructure to keep track of the enrolled subjects. Due to the complex settings and high mobility encountered in low- and middle-income countries, the subjects had to be tracked and their whereabouts identified in a time-consuming manner and in many instances they could not be located at all during the follow-up.

Second, given differences in the sample size of each site and the proportion of losses at follow-up, readers should be aware that the overall analysis across the five sites was disproportionately influenced by the locations that provided the largest numbers of subjects.

Third, the ascertainment of mortality relied on reports by informants, usually relatives of the subject. Alternative sources, such as official mortality statistics, were not available in all sites.

However, these limitations do not seriously threaten the validity of the outcome of the study. Moreover, the low rates of utilizing professional psychological services in both the BIC (5.7%) and the TAU (5.0%) groups suggest that the differences seen in the subsequent suicide rates between the groups was due to the intervention itself and not due to other external factors.

Finally, the original design of SUPRE-MISS did not include a cost-effectiveness component. The incorporation of such an economic dimension in the research would have enabled tracking of the services and resources used by study participants, which could then be related to study outcomes. In the specific context of this study, costs of intake, initial interview, usual care and last follow-up were equal in both BIC and TAU; there was an additional

cost of the BIC in the form of training and staff costs for conducting the 1-hour brief information session and eight follow-up contacts (of about 5 minutes each). This additional cost would need to be weighed against the potential reduction in the use of services and other resources by patients in the BIC group and their better ability to participate in work and social tasks as compared to the TAU group. Ultimately, one could also make an attempt to attach a value to the lives lost and compare the cost of the intervention to the deaths averted.

### Conclusion

The results of the BIC presented in this article show that universal and selective suicide prevention strategies should be complemented by indicated strategies. Focusing on suicide attempters by providing psychosocial counselling and supportive ongoing contact can significantly reduce mortality due to suicide.

One of the main advantages of BIC is that it requires little training, as opposed to the high-skill training that is characteristic of more sophisticated psychotherapeutic treatment, such as cognitive-behavioural therapy. Given its low cost, it can be carried out with very modest resources of space, equipment and personnel. This makes it suitable for extensive application in low- and middle-income countries. ■

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**Competing interests:** None declared.

## Résumé

### Effacité d'une intervention et d'un contact brefs chez les personnes ayant tenté de se suicider : essai contrôlé randomisé dans cinq pays

**Objectif** Déterminer si une intervention et un contact brefs peuvent être efficaces pour réduire la mortalité ultérieure par suicide chez les personnes ayant tenté de se suicider dans les pays à revenu faible et moyen.

**Méthodes** Des personnes ayant tenté de se suicider (n = 1867), identifiées par le personnel médical des services d'urgence de huit hôpitaux collaborateurs dans cinq sites culturellement différents (Campinas au Brésil, Chennai en Inde, Colombo au Sri Lanka ; Karaj en République islamique d'Iran, et Yuncheng en Chine), ont participé, de janvier 2002 à octobre 2005, à un essai contrôlé randomisé et dans ce cadre, ont bénéficié d'un traitement comme à l'habitude ou d'un tel traitement complété par une intervention

et un contact brefs (BIC), comprenant une éducation et un suivi du patient. Globalement, 91 % de ces personnes sont allées jusqu'au bout de l'essai. La principale mesure de résultat de l'étude était la mortalité par suicide à 18 mois de suivi.

**Résultats** Le nombre de décès par suicide était significativement plus faible parmi le groupe ayant bénéficié de la procédure BIC que dans le groupe ayant reçu le traitement habituel (0,2 % contre 2,2 % respectivement,  $\chi^2 = 13,83$ ,  $p < 0,001$ ).

**Conclusion** Cette intervention brève et peu onéreuse peut constituer une composante importante des programmes de prévention du suicide dans les pays à revenu faible et moyen manquant de ressources.

## Resumen

### Eficacia de una intervención de información y contactos en los casos de intento de suicidio: ensayo controlado aleatorizado en cinco países

**Objetivo** Determinar si una intervención de información breve y contactos es una medida eficaz para reducir la mortalidad posterior por suicidio entre quienes han intentado suicidarse en los países de ingresos bajos y medios.

**Métodos** Un total de 1867 personas que habían intentado suicidarse seleccionadas por personal médico en los servicios de urgencia de ocho hospitales colaboradores en cinco lugares con distinto contexto cultural (Campinas, Brasil; Chennai, India; Colombo, Sri Lanka; Karaj, República Islámica del Irán; y Yuncheng, China) participaron entre enero de 2002 y octubre de 2005 en un ensayo controlado aleatorizado para someterse bien al tratamiento habitual, o bien al tratamiento habitual más una intervención consistente en una sesión breve de información y

educación del paciente y una serie de contactos de seguimiento (I+C). Globalmente, finalizaron el estudio el 91% de los pacientes. La variable principal de medición del resultado del estudio fue la muerte por suicidio en los 18 meses de seguimiento.

**Resultados** En el grupo sometido a I+C se observó una tasa de defunciones por suicidio significativamente menor que en el grupo tratado de la forma habitual (0,2% frente al 2,2%, respectivamente;  $\chi^2 = 13,83$ ,  $p < 0,001$ ).

**Conclusión** Esta intervención breve de bajo costo podría ser un componente importante de los programas de prevención del suicidio en los países de ingresos bajos y medios que carecen de recursos suficientes.

## ملخص

### فعالية التدخلات الوجيهة والاتصال بمحاوولي الانتحار: دراسة معشاة مُضَبَّطَة بالشواهد في خمسة بلدان

شملت توعية المرضى ومتابعتهم. وبوجه عام استكمل 91% منهم الدراسة. وكان مقياس حسيلة الدراسة الأولي هو الوفاة بسبب الانتحار في غضون 18 شهراً من المتابعة.

**الموجودات:** كانت الوفيات الناجمة عن الانتحار في المجموعة التي حصلت على المعالجة المعتادة والتدخلات الوجيهة والاتصال أقل بشكل يعتد به إحصائياً (0.2%) من المجموعة التي حصلت على المعالجة المعتادة فقط (2.2%)؛ وكانت  $\chi^2 = 13.83$ ، وقوة الاحتمال أقل من 0.001.

**الاستنتاج:** يمكن لهذا التدخل الوجيه المنخفض التكلفة أن يكون جزءاً مهماً في برامج مكافحة الانتحار في البلدان المنخفضة الدخل والمتوسطة الدخل التي تعاني من نقص الموارد.

**الهدف:** استهدفت الدراسة معرفة مدى فعالية التدخلات الوجيهة والاتصال في خفض معدلات الوفاة المترتبة على الانتحار بين صفوف محاوولي الانتحار في البلدان المنخفضة الدخل والمتوسطة الدخل.

**الطريقة:** أُجريت في الفترة من كانون الثاني / يناير 2002 إلى تشرين الأول / أكتوبر 2005 تجربة معشاة مضبطة بالشواهد، شارك فيها 1867 من محاوولي الانتحار الذين تعرف عليهم العاملون الطبيون في وحدات الطوارئ في ثمانية من المستشفيات المتعاونة في خمس مناطق متباينة الثقافات (كامبينا في البرازيل، وشناي في الهند، وكولومبو في سري لانكا، وكاراج في جمهورية إيران الإسلامية، ويونشنج في الصين). وتم في هذه التجربة إعطاء إما المعالجة المعتادة فقط، وإما المعالجة المعتادة مع تدخلات ووجيهة ونوع من الاتصال،

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