Pesticide exposure and suicidal ideation in rural communities in Zhejiang province, China

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Objective To investigate the association between pesticide exposure and suicidal ideation in rural areas of China.
Methods The analysis involved data from a survey of a representative sample of 9811 rural residents in Zhejiang province who had been asked about the storage of pesticides at home and about whether or not they had considered suicide within the 2 years before the interview. The Chinese version of the 12-item General Health Questionnaire (GHQ) was administered to screen for mental disorder.
Findings The unadjusted odds ratio (OR) for the association between pesticide storage at home and suicidal ideation over the prior 2 years was 2.12 (95% confidence interval, CI: 1.54–2.93). After adjusting for gender, age, education, socioeconomic status, marital status, physical health, family history of suicidal behaviour, GHQ caseness and study design effects, the OR was 1.63 (95% CI: 1.13–2.35).
Conclusion A potential marker of chronic pesticide exposure was found to be associated with suicidal ideation, which supports findings from previous studies. Given the high level of pesticide exposure and the high suicide risk in rural China, clarification of the causal mechanisms underlying this association and the development of appropriate interventions are priorities for public health and health policy.

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

The use and availability of pesticides are significant concerns in the field of mental health, not only because these chemicals are used in suicide attempts[1] but also because their possession may be directly associated with mental disorder. Suicide rates are reported to be higher in areas where organophosphates are used[2] and exposure is a possible risk factor for Parkinson disease[3,4] and Alzheimer disease,[3] for depressive and anxiety disorders[5,6] and for mortality ascribed to mental disorder.[7] However, research in this area remains controversial.[8,9] Pesticides have been widely used in agriculture since the 1950s[10] but, despite precautionary measures, intentional and occupational poisoning remain major concerns. For example, pesticide ingestion was implicated in 62% of suicides in China between 1996 and 2000, which corresponds to around 175 000 cases per year.[1,11]

Suicide in China accounts for 44% of all suicides worldwide.[12] Moreover, suicide is the fifth leading cause of death in China[13] overall and the leading cause in 15–34-year-olds.[14] In rural areas, suicide rates are 2–5 times those in urban areas[13,15] and, in contrast to Western populations, the rate is higher in women than men.[13] Although mental disorder, especially depression, is associated with suicide,[16] the link between suicide and mental disorder may be relatively weak in China.[13] The reasons for the high rate and unique pattern of suicide in China have yet to be established.

Organophosphate pesticides are used widely in China and the potential for exposure is high. Despite this, the mental health risks of prolonged exposure remain unclear. We investigated the association between the storage of pesticides at home and recent suicidal ideation in rural China by analysing data from a province-wide survey of mental disorders that was carried out in 2001 as part of a WHO and Chinese Ministry of Health project.

Methods

The study was performed in Zhejiang province, a densely populated coastal province of China that in 2000 had a total population of 45 million, 70% of which lived in rural areas. It is one of the most developed provinces in China and in 2000 had an average per capita gross domestic product (GDP) of 13 461 renminbi (US$ 1660), the fourth highest among China's 31 provinces and independent municipalities.

Sample size

The survey was designed to ascertain a prevalence of mental disorder of 15% with 1% precision. In addition, the sample size was increased to 15 000 to enable comparisons to be made according to gender and urban or rural residence. The ratio of urban to rural residence was estimated to be 1:2.[17]

Sampling procedure

The survey employed a multistage sampling process that has previously been described in detail by Shi et al.[18] The sampling frame was the province-wide computerized household registry, which was updated during the 2000 national census. Seven indicators (i.e. population density, birth rate, the proportion of non-agricultural labourers, per capita GDP, illiteracy rate, crude death rate and proportion aged > 65 years)

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for 11 cities and 63 rural counties were subjected to a principal components factor analysis. Two factors accounted for 65.2% of the variance. The factor scores were then used to construct five strata: (i) 5 cities (comprising 45.5% of the total urban population); (ii) 6 cities (comprising 54.5% of the total urban population); (iii) 19 counties (comprising 30.2% of the total rural population); (iv) 13 counties (comprising 20.6% of the total rural population); and (v) 31 counties (comprising 49.2% of the total rural population). This analysis considered only the three rural strata, which broadly corresponded to mountain, plains and coastal regions.

Groups of three, two and five counties were selected from the three rural strata (mountain, plains and coastal regions, respectively) by sampling in proportion to the population aged 15 years or over. Thereafter, five districts within each county and, subsequently, two villages within each district were sampled in proportion to their populations. Systematic random sampling was used in each stratum to select the counties, districts, and villages. A total of 100 villages were selected from the 50 rural districts sampled from the 10 counties. The final stage of sampling, which was again carried out in proportion to population size, involved the identification of 1000 residents aged 15 years or more in each of the 10 counties. At each village, simple random selection was used to identify target subjects from the computerized registry of community residents. The demographic characteristics of the selected population sample were similar to those of the province as a whole.[17] At each village, a 20% supplemental sample was also selected using the same method.

During the survey at least three attempts were made to contact selected individuals but 3372 (22.5%) could not be contacted, primarily because of non-residence. A similar proportion of men and women (i.e. 22.6% and 22.4%, respectively) could not be contacted, and these individuals were, on average, 5 years younger than those who could be contacted: mean age 39.3 years and 44.3 years, respectively. People of a similar age and gender to replace the 3372 individuals who could not be located were randomly selected from three sources: the supplemental sample at that location (n = 567), neighbouring households of the target subjects (n = 2133) and, for two sites at which most residents had relocated, neighbouring communities (n = 672).

Assessments

Interviews were carried out in study participants' homes by 34 trained psychiatric nurses between September and December 2001. All participants provided verbal informed consent after the study had been fully explained. Local ethics review boards were not in place at the time of the survey. According to standard practice at that time, the survey was initially considered and approved by WHO and further consideration and approval were then provided by the Department of Disease Control and the Department of International Cooperation at the Chinese Ministry of Health, as well as by the Mental Health Leading Group of Zhejiang province. The principal independent variable considered in this analysis was the storage of pesticides at home. In households where informants reported storing pesticides (excluding rodenticides), the type of pesticide and method of storage were recorded.

All participants were asked the following questions: "Have you ever considered suicide or deliberate self-harm in your lifetime?", "Have you ever planned suicide or deliberate self-harm in your lifetime?", and "Have you ever attempted suicide or deliberate self-harm in your lifetime?". If any of the above were answered positively, further questions were asked about the respondent's age at the first and most recent episode or occurrence. The primary dependent variable was whether or not the respondent reported suicidal ideation in the 2 years before the interview. No participant reported attempting or planning suicide without previous suicidal ideation.

The Chinese version of the 12-item General Health Questionnaire (GHQ) was administered to all participants and a cut-off score of 3/12 was used to define GHQ caseness,[19] which was treated as a covariate. This instrument was translated into Chinese and validated in the 1980s[20,21] and has been widely used. Recent specific ethnographic evaluation has supported its applicability in a rural Chinese context.[22] Other covariates were age, sex, years of formal education, marital status, annual per capita household income (in three strata), family history of suicidal behaviour, and subjective global physical health status in the prior month, which was categorized on a 5-point scale and then dichotomized to "poor health" versus "others". The rural stratum of the participant was also considered as a covariate and as an effect modifier. For unadjusted analyses, the three rural strata were ordered according to the frequency of suicidal ideation, although this ordering differed from that of the socioeconomic indices (i.e. the order of areas with ascending socioeconomic indices were mountain followed by coastal followed by plains regions).

Statistical analysis

Statistical weighting was applied so that the participants selected accurately represented the total population of Zhejiang province. Within each cluster (i.e. each village), the initial weight was the number of individuals in the population represented by the cluster divided by the number of completed interviews in that cluster. Thus, the weight incorporated an adjustment for individuals included in a sample but not interviewed. In addition, weights were further adjusted to reduce the effect of extreme weights: in clusters in which the weight was greater than two standard deviations above the average weight, the value was reduced to equal two standard deviations. Finally, post-stratification weights were obtained to compensate for any mismatch between the age and gender distributions of each stratum and the age and gender distributions of individuals aged 15 years or more in Zhejiang province. Post-stratification weights that took design effects and clustering into account were used in the analysis. Standard errors were adjusted for unequal sampling fractions within each stratum and for possible homogeneity within each cluster. The analysis employed the complex survey procedures in SPSS 15.0 statistical software (SPSS Inc., Chicago, Illinois, United States of America). Logistic regression analysis was used to examine the relationships between suicidal ideation in the prior 2 years, reported storage of pesticides in the home, and other covariates.

Table 1. **Associations between pesticide storage at home and demographic, socioeconomic and clinical characteristics, Zhejiang province, China, 2001**

Characteristic	No. of respondents (Total = 9159)	Percentage reporting pesticide storage at home[a]	OR[a]	95% CI[a]	*P*-value (Wald χ^2)
Gender					
Male	4591	55.6	1.00		< 0.001
Female	4568	49.8	0.79	0.72–0.87	
Age					
≤ 34 years	3206	49.7	1.00		0.001[b]
35–49 years	2990	55.4	1.26	1.13–1.41	
≥ 50 years	2963	54.2	1.20	1.07–1.34	
Duration of education					
≥ 10 years	800	42.9	1.00		< 0.001[b]
6–9 years	3980	53.5	1.53	1.29–1.81	
≤ 5 years	4379	54.2	1.58	1.33–1.86	
Annual per capita household income					
≥ 5000 renminbi	3008	43.2	1.00		< 0.001[b]
2500–4999 renminbi	3120	59.7	1.95	1.74–2.18	
< 2500 renminbi	3031	56.9	1.74	1.55–1.95	
Rural stratum					
Coastal region	1835	19.8	1.00		< 0.001[b]
Plains region	2703	66.3	7.98	6.87–9.28	
Mountain region	4621	60.5	6.22	5.41–7.15	
Marital status					
Never married	1491	46.3	1.00		< 0.001
Ever married	7668	54.3	1.38	1.22–1.56	
Poor physical health					
No	8428	52.5	1.00		0.096
Yes	731	56.1	1.16	0.97–1.37	
Family history of suicidal behaviour					
No	8805	52.1	1.00		< 0.001
Yes	354	69.8	2.12	1.65–2.72	
GHQ caseness					
No	7005	52.0	1.00		0.015
Yes	2154	55.4	1.14	1.03–1.28	

CI, confidence interval; GHQ, General Health Questionnaire; OR, odds ratio.
[a] All percentages, odds ratios and 95% confidence intervals were adjusted for design effects and clustering (see statistical methods).
[b] Result of the test for linear trend is statistically significant.

Results

Of the 10 035 individuals in the selected sample from the 10 rural counties, 9811 (97.8%) completed the interview. The 224 who did not complete the interview included 202 who refused to participate, 17 who were unable to participate because of severe illness or intervening mortality and 5 who completed only part of the interview. Among those who did complete it, 7627 (77.7%) were from the original sample and 2184 (22.3%) were replacements from the sources described above.

Of the 9811 respondents, 5116 (52.1%) stored pesticides in the home. Among the 5088 who reported the method of storage, 249 (4.9%) locked up the pesticides, 1588 (31.2%) stored them in a high location not easily accessible by children, and 3251 (63.9%) stored them where they were easily accessible by all household residents. Of the pesticides stored at home, 86.9% comprised or included organophosphates. The most commonly stored pesticide was methamidophos, which was present in 63.4% of households that stored pesticides.

Self-report lifetime prevalence estimates of suicidal ideation, planning suicide and attempting suicide in the 9811 respondents were 4.8%, 0.9% and 0.4%, respectively. Prevalence estimates for the most recent 2 years were 2.0%, 0.4% and 0.2%, respectively. To avoid potential misclassification of cases, the 270 individuals who only reported suicidal ideation more than 2 years previously were excluded. This left 9541 participants. Moreover, the analysis was further restricted to 9159 participants for whom complete data on all covariates were available.

Associations between pesticide storage at home and demographic, socioeconomic and clinical covariates, adjusted for design effects and clustering only, are summarized in Table 1. The presence of pesticides at home

Table 2. **Associations between suicidal ideation in the 2 years prior to the study and pesticide storage and participants' demographic, socioeconomic and clinical characteristics, Zhejiang province, China, 2001**

Characteristic	No. of respondents (Total = 9159)	Percentage reporting suicidal ideation in prior 2 years[a] (%)	OR[a]	95% CI[a]	*P*-value (Wald χ^2)
Pesticide storage at home					
No	4218	1.07	1.00		
Yes	4941	2.54	2.40	1.68–3.43	< 0.001
Storage methods					
No pesticide storage	4218	1.07	1.00		
Locked	205	1.37	1.28	0.38–4.26	< 0.001[b]
Unlocked high up	1472	2.08	1.96	1.21–3.16	
Easy access	3264	2.82	2.67	1.83–3.90	
Gender					
Male	4591	1.22	1.00		
Female	4568	2.51	2.09	1.49–2.94	< 0.001
Age					
≤ 34 years	3206	1.27	1.00		
35–49 years	2990	1.69	1.34	0.86–2.08	< 0.001[b]
≥ 50 years	2963	2.83	2.26	1.51–3.38	
Duration of education					
≥ 10 years	800	0.68	1.00		
6–9 years	3980	1.32	1.96	0.79–4.84	< 0.001[b]
≤ 5 years	4379	2.63	3.94	1.63–9.52	
Annual per capita household income					
≥ 5000 renminbi	3008	1.07	1.00		
2500–4999 renminbi	3120	2.17	2.06	1.31–3.22	< 0.001[b]
< 2500 renminbi	3031	2.42	2.30	1.47–3.58	
Rural stratum					
Coastal region	1835	0.56	1.00		
Plains region	2703	2.25	4.06	2.03–8.11	< 0.001[b]
Mountain region	4621	2.26	4.09	2.09–8.02	
Marital status					
Never married	1491	1.29	1.00		
Ever married	7668	1.97	1.54	0.94–2.54	0.088
Poor physical health					
No	8428	1.29	1.00		
Yes	731	9.07	7.65	5.39–10.86	< 0.001
Family history of suicidal behaviour					
No	8805	1.63	1.00		
Yes	354	7.44	4.85	2.90–8.11	< 0.001
GHQ caseness					
No	7005	0.58	1.00		
Yes	2154	6.18	11.26	7.78–16.31	< 0.001

CI, confidence interval; GHQ, General Health Questionnaire; OR, odds ratio.
[a] All percentages, odds ratios and 95% confidence intervals were adjusted for design effects and clustering (see statistical methods).
[b] Result of the test for linear trend is statistically significant.

was significantly associated with male gender, older age, fewer years of education, lower income, current or previous marriage, a family history of suicidal behaviour and GHQ caseness. Significant differences were also found between the three regions.

Associations between suicidal ideation in the 2 years prior to the study and pesticide storage and demographic, socioeconomic and clinical covariates, adjusted for design effects and clustering only, are summarized in Table 2. The odds ratio (OR) for the association between pesticides stored at home and suicidal ideation over the prior 2 years was 2.40 (95% confidence interval, CI: 1.68–3.43). Suicidal ideation was also significantly associated with pesticide storage method, female gender, older age, fewer years of education, lower income, poor physical health, a family history of suicidal behaviour and GHQ caseness, and was significantly different between the three regions.

In the logistic regression models, suicidal ideation in the prior 2 years

remained significantly associated with pesticide storage at home. As shown in Table 3, the unadjusted OR for the association between pesticides stored at home and suicidal ideation over the prior 2 years was 2.12 (95% CI: 1.54–2.93). Adjustment for only design effects and clustering had a minor effect on the estimated OR, which became 2.40 (95% CI: 1.68–3.43). The only substantial change in the OR of interest occurred following adjustment for the rural stratum. After full adjustment (i.e. model 11 in Table 3), the ORs for suicidal ideation for different storage methods compared to no storage at home were as follows: for locked storage, 1.13 (95% CI: 0.32–4.00); for unlocked high-up storage, 1.40 (95% CI: 0.86–2.25); and for easy access, 1.76 (95% CI: 1.18–2.59).

Further analyses were carried out separately for the three rural strata (Table 4). After full adjustment, a significant association between pesticide storage at home and suicidal ideation was found in the plains region but not in the mountain or coastal region. Finally, analyses were repeated using all (i.e. not just recent) suicidal ideation as an outcome and home storage of organophosphates as the only exposure. Overall, there was no meaningful change in the associations of interest (data not shown).

Table 3. **Logistic regression analysis of the association between pesticide storage at home and suicidal ideation in the 2 years prior to the study showing adjustments for potential confounding factors, Zhejiang province, China, 2001**

Model	Covariates included in adjustment	Association between pesticide storage at home and suicidal ideation in the prior 2 years		
		OR	95% CI	*P*-value (Wald χ^2)
1	unadjusted	2.12	1.54–2.93	< 0.001
2	model 1 adjusted for design effects and clustering	2.40	1.68–3.43	< 0.001
3	model 2 + gender	2.51	1.75–3.62	< 0.001
4	model 3 + age	2.49	1.73–3.60	< 0.001
5	model 4 + education duration	2.45	1.70–3.54	< 0.001
6	model 5 + annual income	2.35	1.62–3.40	< 0.001
7	model 6 + rural stratum	1.88	1.31–2.68	0.001
8	model 7 + marital status	1.88	1.32–2.69	< 0.001
9	model 8 + physical health	1.83	1.28–2.63	0.001
10	model 9 + family history of suicidal behaviour	1.74	1.21–2.50	0.003
11	model 10 + GHQ caseness	1.63	1.13–2.35	0.009
12	model 10 + GHQ total score	1.65	1.13–2.41	0.010

CI, confidence interval; GHQ, General Health Questionnaire; OR, odds ratio.

Discussion

We found a positive, independent association between the presence of pesticides in the home and suicidal ideation in the prior 2 years in a large representative sample of the rural population of Zhejiang province, China. We also found that reported suicidal ideation became more common with increasing ease of access to pesticides and, furthermore, that the highest prevalence of reported suicidal ideation was in the two rural strata (i.e. the plains and mountain regions) with the highest prevalence of pesticide storage at home.

The strong points of this study are that it involved a large, representative sample and that the response rate was high, both of which indicate that the results can be readily applied to the source population.

An important limitation is that individual pesticide exposure was not directly measured. Chronic low level exposure to pesticides is difficult to ascertain directly, particularly in a large-scale community study where biological assays are not feasible. Occupational exposure is also difficult to ascertain because of the near universal use of pesticides in agriculture. We therefore had to use self-report data on home storage as a proxy measure of exposure. Pesticide storage is not a sensitive issue in these communities so it is unlikely that respondents intentionally underreported home storage or that their reports were influenced by the presence or absence of previous suicidality. Moreover, measurement inaccuracy would have the effect of diluting the association of interest. Similarly, although prior suicidal thoughts may be underreported, underreporting is unlikely to vary with respect to pesticide storage. If the associations described here do indeed relate to an individual's level of pesticide exposure rather than stem from reverse causality or unmeasured confounding, the true association between suicidality and underlying exposure is likely to be substantially stronger than that estimated here using the proxy measure.

With respect to confounding, the logistic regression analysis showed that none of the covariates accounted substantially for the association identified between exposure to pesticides and suicidal ideation. However, it should be borne in mind that physical and mental health were assessed relatively briefly and additional research is required to clarify potential mediating and confounding effects further. Although the GHQ has been translated into Chinese and validated in Chinese populations, it may nonetheless underestimate mental distress since it makes use of a 12-point scale that cannot encompass all forms of psychopathology, such as the expression of emotional distress through somatic complaints, which has been observed in Chinese populations.[23]

The cross-sectional nature of the study does not enable the direction of cause and effect to be definitively inferred. It is possible that the possession of pesticides was a consequence of suicidal ideation, although we think that this is unlikely for the following reasons: (i) the hypothesized outcome was rare compared with pesticide exposure; (ii) the association between pesticide storage at home and suicidal ideation was independent of GHQ status; (iii) the association of interest was little affected by whether suicidal ideation throughout life or in the previous 2 years was defined as the outcome; and (iv) the association increased with ease of pesticide access.

Table 4. **Associations between pesticide storage at home and suicidal ideation in the 2 years prior to the study in three rural strata corresponding to mountain, coastal and plains regions, Zhejiang province, China, 2001**

Rural stratum	No. of respondents	Percentage with suicidal ideation	Association between pesticide storage and suicidal ideation in prior 2 years	
			Adjusted for design effects and clustering	Adjusted for design effects, clustering and other covariates[a]
			OR (95% CI)	OR (95% CI)
Mountain region (*n* = 4621)				
No pesticide storage at home	1817	2.02	1.00	1.00
Pesticide storage at home	2804	2.43	1.21 (0.79–1.86)	1.07 (0.69–1.65)
Coastal region (*n* = 1835)				
No pesticide storage at home	1462	0.52	1.00	1.00
Pesticide storage at home	374	0.74	1.44 (0.40–5.15)	1.13 (0.32–3.92)
Plains region (*n* = 2703)				
No pesticide storage at home	941	0.81	1.00	1.00
Pesticide storage at home	1763	2.98	3.76 (1.69–8.34)	3.38 (1.49–7.66)

CI, confidence interval; OR, odds ratio.

[a] The other covariates were gender, age, education duration, annual income, marital status, physical health, family history of suicidal behaviour and General Health Questionnaire caseness.

Pesticide possession was frequent in this population and many of the commonly stored pesticides contained methamidophos, an organophosphate insecticide that persists in water and soil following contamination and that has been classified by WHO as a class-I pesticide (i.e. extremely or highly toxic). In addition, the liquid preparation used in agriculture is volatile, making it particularly hazardous.[24] The assumption underlying our analysis is that participants who keep pesticides at home will have experienced higher chronic low-level exposure, principally through transdermal or respiratory absorption, possibly during storage but more likely due to increased use or spillage. While biologically plausible, the association between home storage and the level of individual exposure has not, to our knowledge, been directly demonstrated, although home storage has been cited as an undesirable potential source of exposure.[25] Most studies have focused on occupational use as a proxy for chronic low-level exposure and have compared high- and low-exposure workers. This is not feasible in rural China because of the homogeneity of occupation. One study found higher levels of urine metabolites in children from communities where pesticides were used and stored,[26] suggesting that exposure may take a wide variety of routes. However, home storage cannot definitively be implicated and it is possible that exposure could occur through contamination of clothing or other fabrics or deficient pesticide preparation practices.

Several studies have indicated that pesticide use is associated with neurological disorders and worse mental health[3–6] as well as with suicidal thoughts and behaviour.[2] There are a variety of potential causal mechanisms. Imbalance in cholinergic pathways are implicated in depressive disorder[27] and organophosphates, including methamidophos, inhibit cholinesterase activity.[28] Paraoxonase activity may be a modifying factor since paraoxonase is known to hydrolyse a wide variety of organophosphates and plays a role in their detoxification.[29,30]

Although chronic exposure to organophosphates may increase suicide through increasing depressive symptoms,[2] a large number of people in China who develop suicidal thoughts or who complete suicide do not have an apparent mental illness.[13,31] There may, therefore, be different aetiological mechanisms. The ready availability of highly lethal means could, for example, convert impulsive, low-intent suicide "attempts" among persons without a mental illness into completed suicides.[32] Suicidality may be a separate symptom domain independent of depression,[33] and it has been suggested that some risk factors for suicidality do not act through increasing depression.[34–37] Frontal lobe syndromes and increased impulsivity would be one example of an alternative causal pathway. The observation that adjustment for GHQ score did not affect the association of interest may reflect this; however, as highlighted earlier, some aspects of depressive symptomatology may not be adequately identified by this instrument in the Chinese population.

The findings of this study might partially account for the much higher incidence of suicide in rural than urban areas of China. The observed association in our study between pesticide storage in different regions and suicidal ideation in those regions is interesting. Less easy to explain are the apparent differences in the association of interest between regions. They require further replication and evaluation. The direction of cause and effect also requires further research that makes use of more accurate markers of chronic exposure. Regardless of the direction of causation, the association between pesticide exposure and suicidality demonstrates that potentially vulnerable groups with previous suicidal thoughts have increased access to highly toxic chemicals. This is of particular concern in China and other agriculture-based Asian and Pacific nations where suicidal behaviour is often related to impulsivity and the ready availability of a lethal method.[12,13]

The influence of pesticide exposure on mental disorder, suicide and overall

health is a very important public health issue. To address this, in 2006 three WHO departments announced a global public health initiative and released a report on community interventions for safer access to pesticides.[38] It is vital that these messages are disseminated as widely as possible to the appropriate policy-makers. ■

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Competing interests: None declared.

Résumé

Exposition aux pesticides et idées suicidaires dans les communautés rurales de la province du Zhejiang en Chine

Objectif Étudier l'association entre l'exposition aux pesticides et les idées suicidaires dans les zones rurales chinoises.

Méthodes L'analyse a porté sur les données d'une enquête sur un échantillon représentatif de 9811 habitants ruraux de la province du Zhejiang auxquels on a demandé s'ils stockaient des pesticides à domicile et s'ils avaient envisagé de se suicider dans les deux ans précédant l'entretien. La version chinoise du Questionnaire général de santé en 12 points pour les troubles mentaux (GHQ) a été administrée pour dépister les éventuels troubles mentaux.

Résultats L'Odds ratio (OR) non ajusté pour l'association entre le stockage de pesticides à domicile et les idées suicidaires sur la période antérieure de 2 ans était de 2,12 (intervalle de confiance à 95 %, IC : 1,54-2,93). Après ajustement pour le sexe, l'âge, le niveau d'éducation, le statut socioéconomique, le statut marital, la santé physique, les antécédents familiaux de comportement suicidaire, la susceptibilité d'être atteint de troubles mentaux et les effets du type d'étude, l'OR était de 1,63 (IC à 95 % : 1,13-2,35).

Conclusion On a constaté qu'un marqueur possible de l'exposition chronique aux pesticides était associé aux idées suicidaires, ce qui confirme les résultats des études antérieures. Compte tenu de la forte intensité de l'exposition aux pesticides et du risque élevé de suicide en Chine rurale, l'explicitation des mécanismes causals sous-jacents à cette association et le développement d'interventions appropriées sont des priorités en matière de santé publique et de politique sanitaire.

Resumen

Exposición a plaguicidas e ideas suicidas en comunidades rurales de la provincia de Zhejiang, China

Objetivo Investigar la relación entre la exposición a plaguicidas y las ideas suicidas en zonas rurales de China.

Métodos Este análisis se basó en los datos de una encuesta de una muestra representativa de 9811 habitantes de zonas rurales de la provincia de Zhejiang a quienes se les preguntó si almacenaban plaguicidas en su hogar y si en los dos últimos años habían considerado en algún momento la posibilidad de suicidarse. A fin de detectar posibles trastornos mentales, se utilizó también la versión en chino del Cuestionario de Salud General (GHQ) de 12 ítems.

Resultados La oportunidad relativa (OR) no ajustada para la relación entre el almacenamiento de plaguicidas en el domicilio y las ideas suicidas durante los dos años precedentes fue del 2,12% (intervalo de confianza [IC] del 95%: 1,54-2,93). Después de ajustar en función del sexo, la edad, la educación, el nivel socioeconómico, el estado civil, la salud física, los antecedentes familiares de comportamiento suicida, las puntuaciones obtenidas en el GHQ y los efectos del diseño del estudio, la OR fue de 1,63 (IC95%: 1,13-2,35).

Conclusión Se ha detectado una relación significativa entre un posible marcador de la exposición crónica a plaguicidas y las ideas suicidas, lo que avala los resultados de estudios anteriores. Considerando el alto nivel de exposición a plaguicidas y el alto riesgo de suicidio que se dan en la China rural, el esclarecimiento de los mecanismos causales de esa relación y el desarrollo de las intervenciones oportunas son una prioridad para la salud pública y las políticas sanitarias.

ملخص

التعرُّض لمبيدات الهوام والتفكير بالانتحار في المجتمعات الريفية في مقاطعة زيجيانغ في الصين

الهدف: استقصاء الارتباط بين التعرُّض لمبيدات الهوام والتفكير بالانتحار في المناطق الريفية في الصين.

الطريقة: شمل التحليل معطيات جمعت من مسح لعينة ممثلة تتألَّف من 9811 من القاطنين في أرياف زيجيانغ، وقد سئلوا عن خزن مبيدات الهوام في المنزل، وما إذا كانوا قد فكروا بالانتحار خلال السنتين اللتين سبقتا إجراء المقابلة. وقد تم تداول النسخة الصينية من الاستبيان حول الصحة العامة المكون من 12 بنداً في المسح الخاص بالاضطرابات النفسية.

الموجودات: كانت نسبة الأرجحية غير المعدّلة للترابط بين خزن مبيدات الهوام في المنزل والتفكير بالانتحار خلال فترة السنتين 2.12 (بفاصلة ثقة مقدارها 95%: 1.54 – 2.93). وبعد إجراء التعديلات المتعلقة بالجندر والسن والتعليم والوضع الاجتماعي والاقتصادي والحالة الزواجية والصحة البدنية والقصة العائلية للسلوك الانتحاري، وتعريف الحالات الواردة في الاستبيان وتأثير تعميم الدراسة، بلغت نسبة الأرجحية 1.63 (بفاصلة ثقة 95%: 1.13 – 2.35).

الاستنتاج: وجد الباحثون أن واسماً محتملاً للتعرُّض المزمن لمبيدات الهوام يترافق مع التفكير بالانتحار، وهو ما يدعم ما وجدته دراسات سابقة. وبالنظر للمستوى المرتفع للتعرُّض لمبيدات الهوام، والخطر المرتفع للانتحار في أرياف الصين، فإن توضيح الآليات السببية التي تقف وراء هذا الارتباط وتطوير تدخلات ملائمة، هي من الأمور التي ينبغي إيلاؤها أولوية في مجال الصحة العمومية والسياسات الصحية.

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