Registration of work-related diseases, injuries, and complaints in Aruba, Bonaire, and Curação

Dick Spreeuwers, Dagmar C. Strikwerda, and Andre N. H. Weel

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ABSTRACT

Objective. To estimate the incidence of work-related diseases, injuries, and complaints in Aruba, Bonaire, and Curação and to identify some next steps in the prevention process.

Methods. All of the three countries' 18 occupational health specialists were asked to participate; 100% agreed to report all work-related diseases, injuries, and complaints in 2004–2008. A standard online notification form was used to register cases in a database maintained by the Netherlands Center for Occupational Diseases (NCOD). The public health service of Curaçao analyzed the data and presented the results to the participating physicians during educational and feedback meetings.

Results. During the study period, 1 519 cases were reported: 720 (47.0%) work-related diseases; 515 (34.0%) injuries; and 284 (19.0%) complaints. The mean patient age was 42.4 years (range 16–70 years); 924 (60.8%) were males and 571 (37.6%), females. Most frequently reported were musculoskeletal diseases, injuries, and complaints; mental health disorders; and skin injuries. Analysis showed incidence rates of work-related diseases, injuries, and complaints in Aruba to be 157 new cases per 100 000 employee years; in Bonaire, 53/100 000; and in Curaçao, 437/100 000.

Conclusions. These results suggest that labor protection laws need improvement and that preventive action should be fostered. Further study is needed on working conditions, preventive policy, and the quality of occupational health and safety practices in Aruba, Bonaire, and Curaçao. Funding is imperative for collecting and publishing accurate data, which will keep this problem on the social-political agenda.

Key words

Occupational health; accident prevention; accidents, occupational; health policy; Netherlands Antilles; Caribbean Region.

In many countries, the registration of work-related diseases and injuries is an important source of information for prevention (1). Moreover, according to

Public Health Service, Willemstad, Curação.

International Labor Organization's Convention in 1981, all countries should maintain a registration system that is capable of providing policymakers with information on work-related diseases and injuries (2). The Caribbean islands of Aruba, Bonaire, and Curaçao lack such a registration system. As a result, they have neither comprehensive workplace health and safety policies nor work-related disease and injury prevention efforts.

Political and economic context

The Netherlands/Dutch Antilles were part of the Kingdom of The Netherlands. Aruba and Curaçao became independent from The Netherlands in 1986 and 2010, respectively, and as such require their own work-related disease and injury policies. Bonaire on the other hand is a municipality governed by The Netherlands and has been under Dutch

Netherlands Center for Occupational Diseases/ Coronel Institute of Occupational Health, Academic Medical Center, University of Amsterdam, The Netherlands. Send correspondence to Dick Spreeuwers, d.spreeuwers@amc.uva.nl

Netherlands Society of Occupational Medicine, Center of Excellence, Utrecht, The Netherlands.

law since 2010, but does not have such policies.

The Central Bureau of Statistics (CBS), which uses the Dutch Standard Classification of Businesses (3), registered the following total number of employees in each country: Aruba, 41 878 in 2006; Bonaire, 5 647 in 2008; and Curação, 53 779 in 2008. In Aruba, tourism currently provides the largest percentage of the country's income. Other primary industries are oil refining and storage, and offshore banking. Bonaire's economy is mainly based on tourism and salt production. In Curação, the main industries are oil refining, tourism, and financial services, with shipping, international trade, and other activities related to Port Willemstad also making a considerable contribution. Table 1 presents the distribution of employees across the economic sectors of the three islands (4, 5).

Occupational health context

Though they do not have preventive policies, both Aruba and Curaçao have a state decree on occupational diseases (Landsbesluit Beroepsziekten) stipulating that employees can obtain financial compensation for any occupational disease on the official list (6, 7); however, the list is limited. In both countries, physicians within the social security office are responsible for conducting medical evaluations of employees with possible

occupational diseases or injuries. Occupational injury insurance is obligatory in Aruba and Curação. In 2005, 883 occupational injuries were reported in Curaçao (8). In Curaçao, occupational health services (OHS) are provided by Arbo Consult (Willemstad, Curação). The social security office provides sick leave guidance and control. Furthermore, a large oil company has its own internal OHS. Arbo Consult also provides occupational health services to companies in Bonaire. In Aruba, during the study period, OHS were mainly provided by the OHS Center and the social security office. In addition, the Dutch Royal Navy in the Caribbean area has its own OHS, that collaborates with local health services in all three countries.

Study context

Vocational training and continuing medical education for occupational physicians in Aruba, Bonaire, and Curaçao are arranged in collaboration with several Dutch educational institutes. Physicians attending these courses indicated that they were encountering many cases of work-related diseases and injuries in daily practice. Therefore, the Netherlands Center for Occupational Diseases (NCOD, Amsterdam, The Netherlands) was asked to contribute to the educational program. Taking into account the area's lack of data on work-related

TABLE 1. Distribution of employed population by economic sector in Aruba, Bonaire, and Curaçao, 2006/2008

| | Aruba (2006) | | Bonaire (2008) | | Curaçao (2008) | |
|--|-----------------|-------|-------------------|-------|-------------------|-------|
| Sector | No. | % | No. | % | No. | % |
| Agriculture, fishing, mining | 250 | 0.6 | 79 | 1.4 | 747 | 1.4 |
| Manufacturing | 2 438 | 5.8 | 172 | 3.0 | 3 563 | 6.6 |
| Electricity, gas & water supply | 500 | 1.2 | 92 | 1.6 | 822 | 1.5 |
| Construction | 3 893 | 9.3 | 577 | 10.2 | 4 157 | 7.7 |
| Wholesale & retail trade | 7 108 | 17.0 | 832 | 14.7 | 9 559 | 17.8 |
| Hotels & restaurants | 7 642 | 18.2 | 908 | 16.1 | 4 358 | 8.1 |
| Transport, storage & communications | 2 901 | 6.9 | 433 | 7.7 | 3 226 | 6.0 |
| Financial intermediation | 1 484 | 3.5 | 166 | 2.9 | 3 976 | 7.4 |
| Real estate, rentals | 3 720 | 8.9 | 351 | 6.2 | 5 504 | 10.2 |
| Public administration & social security | 3 523 | 8.4 | 751 | 13.3 | 5 156 | 9.6 |
| Education | 1 430 | 3.4 | 249 | 4.4 | 2 690 | 5.0 |
| Health & social work | 1 986 | 4.7 | 404 | 7.2 | 4 561 | 8.5 |
| Other community, social & personal service | 2 773 | 6.6 | 462 | 8.2 | 3 389 | 6.3 |
| Private households with employed persons | 1 862 | 4.4 | 106 | 1.9 | 1 998 | 3.7 |
| Extra territorial (e.g. embassies) | 45 | 0.1 | 65 | 1.2 | 73 | 0.1 |
| Not reported | 323 | 0.8 | 0 | 0.0 | 0 | 0.0 |
| Total | 41 878 | 100.0 | 5 647 | 100.0 | 53 779 | 100.0 |

Source: References 4 and 5.

disease and injury, a pilot study was proposed that would report on these within the context of the educational program. In 2004, occupational physicians in Aruba, Bonaire, and Curaçao started the pilot study with the NCOD. Suriname also participated, but its data is not included in this study. The study's objective was to estimate the incidence of work-related diseases, injuries, and complaints in the area, and to identify starting-points for prevention.

METHODS

An observational study was undertaken to estimate incidence rate for work-related diseases, injuries, and complaints in Aruba, Bonaire, and Curação. The NCOD developed a reporting scheme for Aruba, Bonaire, and Curação that is comparable to the Dutch registration system. In the Netherlands, the NCOD only registers notifications of work-related diseases. For this study, the registration was extended to cover work-related complaints and injuries too. Work-related complaints were defined as health problems caused by work-related factors, and with consequences for one's ability to perform at work. To keep the threshold for reporting low, the adjective "work-related" was used as opposed to "occupational," which in this context implies financial compensation for work-related diseases and injuries. Notifications were done anonymously.

The islands' occupational physicians could report the diseases, injuries, and complaints online by visiting a website (www.beroepsziekten.nl) and logging in with a unique password. The NCOD collected and checked the data, and passed it onto the public health center in Curaçao for analysis. The reporting was continuous from January 2004–December 2008.

Study participants

All 18 occupational physicians in Aruba, Bonaire, and Curaçao were asked to participate in the registration study. Information about the study objectives and reporting procedure were provided during training session in Curaçao in 2004. A refresher course and feedback/results were provided in Aruba in 2006. The senior occupational physicians of the OHS and the

social security offices were asked to put work-related diseases on the agendas of their regularly-scheduled physician meetings. Twice annually, the NCOD published a newsletter that provided updates on the study's progress to the participating physicians. Occupational physicians could also seek support from the NCOD helpdesk if they encountered difficulties in diagnosing or reporting work-related diseases.

Measures

Participating physicians were asked to complete an online notification form when reporting a work-related disease, injury, or complaint. The form included the following items: OHS name and code; physician name and code; notification date; patient file number; patient gender; patient year of birth; patient occupation and economic sector; description of diagnosis and ICD-10 code; causes; pre-existing medical conditions; degree of certainty of diagnosis; occupational health examinations; and medical recommendations, including prescriptions, and referrals to physical therapy and additional services. The decision to report the case or not was up to the participating physician, and if reported, within which of the three categories disease, injury, or complaint.

Notifications were processed in the same way as they are in The Netherlands. According to the *Quality Handbook* for the Dutch National Registry (9), two steps determine whether or not a notification is justified: first, an automatic filter checks whether or not all required fields have been completed; and second, a quality determination is made by a team comprising two experts in work-related diseases and two staff members from the registration office.

Analysis

IBM SPSS Statistics software, version 16 (SPSS Inc., an IBM company, Chicago, Illinois, United States) was used to conduct the frequency analysis of work-related diseases, injuries, and complaints. Incidence rates were calculated for work-related diseases, injuries, and complaints at the level of the total workforce of the three islands, and expressed in cases per 100 000 employee-years. The calculations were based on

the mean number of cases reported over 5 years and the registered size of the countries' working populations according to CBS (4, 5).

RESULTS

Of the 18 physicians specializing in occupational health in Aruba, Bonaire, and Curação, all 18 participated in the study; 0 declined. During the 5-year study period (January 2004-December 2008), these 18 participating physicians reported a total of 1519 cases; a median of 23.5 notifications (Inter Quartile Range 10.8–95.0; range: 1–631) per physician. Two OHS in Curação reported 1 176 cases (77.4%); two OHS in Aruba reported 328 cases (21.6%); and in Bonaire, 15 cases (1.0%) were reported. During the study period, a total of 720 work-related diseases (47.4%), 515 injuries (33.9%), and 284 complaints (18.7%) were reported. The most frequent diagnostic categories were: musculoskeletal diseases, injuries, and complaints (43.7%); mental health disorders and complaints (31.3%); and skin diseases and complaints (12.9%) (Table 2); these varied by industrial sector (Figure 1). The patients were 16-70 years of age, with a mean age of 42.4 years; 924 were male (60.8%) and 571, female (37.6%). In 24 cases, data on gender was not available.

Musculoskeletal diseases, injuries, and complaints

Of the reported cases related to the musculoskeletal system, 175 (26.4%) were work-related diseases; 310 (46.7%) were occupational injuries; and 179 (27.0%) were work-related complaints.

Gender distribution was 69.1% male (448 cases) and 30.9% female (200 cases); the mean age was 41.3 years (range 18–70 years). Of the musculoskeletal diseases, the most frequently reported were acute low back pain (29%, 51 cases) and lateral epicondylitis (20.0%, 35 cases). Of the musculoskeletal injuries, fracture of the hand was the most frequently reported (11.3%, 35 cases).

Most cases related to the musculoskeletal system were reported from the construction industry (18.0%) and the government, defense, and social security sector (18.0%). Occupational categories most frequently reported were blue collar jobs in construction, industry, and transport (20.0%); lower-level service jobs (15.0%); and metal workers and mechanics (11.0%). Biomechanical factors were most often reported as the cause (23.0%).

Mental health disorders and complaints

Of the mental health disorders and complaints, the most frequently reported were stress complaints (12.0%) and other reactions to serious stress (8.0%). Mental health disorders and complaints were reported more frequently by females (57.8%, 267 cases) than by males (42.2%, 195 cases); the mean age was 45.1 years (range 21-62 years). Most cases of mental health complaints were reported by employees of the following sectors: government, defense, and social security (51.0%); education (25.0%); and health care (9.0%). The most frequently reported occupations were administrative positions (15.0%); personal services and security employees (11.0%); and teachers (11.0%).

TABLE 2. Number and percentage of reported work-related diseases, injuries, and complaints across diagnosis categories, in Aruba, Bonaire, and Curação combined, 2004–2008

| | Diseases | | Injuries | | Complaints | | Total | |
|------------------------|----------|-------|----------|-------|------------|-------|-------|-------|
| Туре | No. | % | No. | % | No. | % | No. | % |
| Musculoskeletal system | 175 | 24.3 | 310 | 60.2 | 179 | 63.0 | 664 | 43.7 |
| Mental health | 417 | 57.9 | 0 | 0.0 | 58 | 20.4 | 475 | 31.3 |
| Skin | 30 | 4.2 | 166 | 32.2 | 0 | 0.0 | 196 | 12.9 |
| Nervous System | 24 | 3.3 | 11 | 2.1 | 24 | 8.5 | 59 | 3.9 |
| Ear | 34 | 4.7 | 1 | 0.2 | 1 | 0.4 | 36 | 2.4 |
| Eye | 8 | 1.1 | 25 | 4.9 | 3 | 1.1 | 36 | 2.4 |
| Respiratory system | 11 | 1.5 | 0 | 0.0 | 2 | 0.7 | 13 | 0.9 |
| Other | 21 | 2.9 | 2 | 0.4 | 17 | 6.0 | 40 | 2.6 |
| Total | 720 | 100.0 | 515 | 100.0 | 284 | 100.0 | 1 519 | 100.0 |

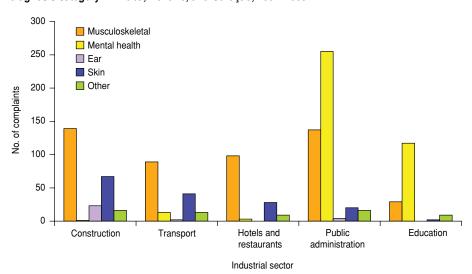


FIGURE 1. Number of work-related complaints, diseases, and injuries by industrial sector and diagnosis category in Aruba, Bonaire, and Curação, 2004–2008

Skin diseases and injuries

Of skin-related issues, the most frequently reported were occupational injuries (84.7%, 166 cases); the remaining were work-related diseases (15.3%, 30 cases). Gender distribution was 80.0% male (155 cases) and 20.0% female (39 cases); the mean age was 40.7 years (range 16-67 years). The most frequently reported occupational injury was injury of the hand. Of the work-related diseases, 50% were contact dermatitis. Diseases and injuries of the skin were most frequent among the construction (29.0%) and water transportation (18.0%) sectors. The more frequently reported occupational categories were blue collar workers in construction, manufacturing, and transportation (36.0%); lower-level service jobs (14.0%); and metal workers and mechanics (13.0%).

Estimated incidence rates

Work-related disease and injury incidence rates were calculated in order to compare them to those of other countries. Analysis showed incidence rates of work-related diseases, injuries, and complaints in Aruba to be 157 new cases per 100 000 employee years; in Bonaire, 53/100 000; and in Curaçao, 437/100 000. The estimated incidence rate of work-related diseases in Aruba was 40/100 000, and of work-related injuries, 75/100 000. Incidence rates of work-related diseases

and injuries for Bonaire were not calculated due to the small number of cases reported. The estimated incidence rate of work-related diseases in Curaçao was 232/100 000, and of work-related injuries, 132/100 000.

DISCUSSION

The aim of this study was to estimate the number of work-related diseases, injuries, and complaints in Aruba, Bonaire, and Curaçao and to identify starting points for prevention. During the 5-year period from 2004–2008, 18 occupational physicians reported 1 519 cases of which musculoskeletal diseases, complaints and injuries; mental health disorders; and injuries of the skin were reported most frequently. The study also provided work-related disease and injury profiles for the various sectors, data that may inform preventive policy.

Prior to this study, there were no figures available on work-related diseases in the Netherlands Antilles; figures on injuries were available only from insurance companies. A strength of this study was the participation of all of the islands' occupational and insurance physicians. Most of these physicians also participated in the educational meetings. The involvement of the Netherlands Center for Occupational Diseases, which has extensive experience with work-related disease registration and research, was another of this study's strong points

(10). Furthermore, regular updates were provided to the participants through a periodic newsletter and consultation of the NCOD helpdesk was encouraged.

The study also had some limitations. Underreporting and selective reporting were at times apparent. After educational meetings, there were peaks in reporting; and some physicians were more active in reporting than others. Also, incidence rates could not be calculated for the various economic sectors because the registered sector names and codes did not always match those defined by CBS. Furthermore, it was not possible to directly calculate estimated incidence rates—the mean of the annually reported cases for a 5-year period was used as the numerator, and a 1-year period of recorded workers as denominator. Since workforce data is not periodically updated, the denominator was determined using the most recent figures available; in Aruba's case, that was 2006. The decision to use the mean annual number of cases in the numerator was based on the observation that the reported number of cases fluctuated over the years. Therefore, in the authors' opinions, the mean annual numbers of cases in the study period are the best indicators for the calculation of incidence rates. Lastly, registration was based only on the reporting physician's clinical diagnosis, whereas in some cases, such as exposure to chemicals or toxins, laboratory testing is required.

The estimated incidence rates of workrelated diseases can be compared with figures from other countries. In a sentinel surveillance study in The Netherlands in 2003 and 2004, the incidence rate of all work-related diseases was 466/100 000 employee-years (95% Confidence Interval [CI]: 438-495) (11). According to the Netherlands' national registry of work-related diseases, in 2009 the incidence rate of work-related diseases was 336 cases/100 000 employeeyears (12). In general, there are large differences among countries' statistics on occupational diseases. For example, the incidence rate of all occupational diseases in Greece in 2001 was 3.4/100 000 employee-years (13), while in Finland in 2002 the rate was 200/100 000 employeeyears (14). The mean incidence rate in the 15 European Union (EU) countries in 2001 was 37/100 000 employee-years (15). It important to note that the studies in the EU, Finland, and Greece presented results according to a standard list of occupational diseases, whereas in The Netherlands and the present study, the figures represent work-related diseases, a much broader term that includes all health events in which work-related factors play a causal role.

In 1999, it was estimated that the number of new cases of work-related diseases in Latin America and the Caribbean was 1.02 million per year, and that of occupational injuries, 9.89 million per year (16). The working population in Latin America and the Caribbean is 179 million people. Based on these figures, the estimated incidence rate of work-related diseases in Latin America and the Caribbean is 570/100 000 employee-years, and that of occupational injuries, 5 525/100 000 employee-years. The estimated incidence rates from the present study are much lower than that of the previous study (16), probably due to considerable underreporting in the present study. There are no indications that working conditions on Aruba, Bonaire, and Curação are better than in other parts of Latin America and the Caribbean.

The results of the work-related disease, injury, and complaint registration process have been presented to and discussed with the participating physicians. The next step would be to share these results with policymakers, employers, and employee-representatives in these countries in order to put prevention efforts on the political agenda. The study results

suggest that labor protection legislation needs improvement and that preventive action should be fostered. Further study is needed on working conditions, preventive policy, and the quality of occupational health and safety practices in Aruba, Bonaire, and Curação.

Funding is imperative for continuing to register new cases, and for making improvements to the current process. Given that the reliability of the data in the present study was limited, a prerequisite to prevention and policy efforts is quality improvement of the registration system (17). Regularly published, accurate figures on work-related diseases, complaints, and injuries will keep this problem on the social-political agenda, and improve the probability of introducing effective work-related disease and injury prevention.

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RESUMEN

Registro de enfermedades, lesiones y síntomas relacionados con el trabajo en Aruba, Bonaire y Curazao *Objetivo.* Calcular la incidencia de enfermedades, lesiones y síntomas relacionados con el trabajo en Aruba, Bonaire y Curazao e identificar los pasos siguientes en el proceso de prevención.

Métodos. Se invitó a participar a los 18 especialistas en salud ocupacional de los tres países; todos aceptaron notificar todas las enfermedades, lesiones y síntomas relacionados con el trabajo entre el 2004 y el 2008. Se usó un formulario estándar de notificación en línea para registrar los casos en una base de datos mantenida por el Centro para las Enfermedades Ocupacionales de los Países Bajos. El servicio de salud pública de Curazao analizó los datos y presentó los resultados a los médicos participantes durante las reuniones educativas y de retroalimentación.

Resultados. Durante el período del estudio se notificaron 1 519 casos relacionados con el trabajo: 720 (47,0%) enfermedades, 515 (34,0%) lesiones y 284 (19,0%) síntomas. La edad promedio de los pacientes fue 42,4 años (recorrido, 16–70 años); 924 (60,8%) eran varones y 571 (37,6%), mujeres. Se notificaron con mayor frecuencia las enfermedades, lesiones y síntomas musculoesqueléticos; los trastornos mentales; y las lesiones cutáneas. El análisis mostró tasas de incidencia de enfermedades, lesiones y síntomas relacionados con el trabajo de 157 nuevos casos por 100 000 empleados por año en Aruba, 53/100 000 en Bonaire y 437/100 000 en Curazao.

Conclusiones. Estos resultados indican que las leyes de protección laboral deben mejorarse y que deben promoverse las medidas preventivas. Es necesario llevar a cabo otros estudios sobre las condiciones de trabajo, los planes de prevención y la calidad de la salud ocupacional y las prácticas de seguridad en Aruba, Bonaire y Curazao. Se requiere financiamiento para recopilar y publicar datos exactos, a fin de mantener este problema en la agenda política y social.

Palabras clave

Salud laboral; prevención de accidentes; accidentes de trabajo; política de salud; Antillas Holandesas, región del Caribe.