Individual and population burdens of major trauma in the Netherlands

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Objective To assess the impact of major trauma on individual and population health.

Methods Data from a regional trauma registry were used, including all trauma fatalities and nonfatal severely injured patients (injury severity score >15) in 1999 and 2000. The impact of fatalities was expressed in terms of years of life lost (YLL). The impact of severe injury on survivors was expressed in terms of years lived with disability (YLD). Disability weights were based on quality of life at 15 months after injury, measured with EuroQol-5D. Disability-adjusted life years (DALYs) were calculated as the sum of YLLs and YLDs.

Findings There were 567 fatalities and 335 survivors. At the individual level, trauma fatalities (32 YLLs per patient) and nonfatal cases of major trauma (12 YLDs per patient) both led to a substantial loss of healthy life years. Each victim of major trauma contributed an average of 25 DALYs to the burden of disease. At the population level, major trauma caused 10 DALYs per 1000 inhabitants. Road-traffic injury was the main contributor to the population burden of major trauma.

Conclusion Both at individual and population levels, major trauma has a massive impact on health. Most severely injured victims of road-traffic crashes reach the hospital and have good chances of survival. Injury prevention and trauma care policies should aim at further reduction of both fatalities and permanent consequences among survivors.

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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

Injury is not only the leading cause of death in adults below the age of 45 years[1] but also an important cause of functional limitations.[2–4] As survival is a limited indicator of outcome, the focus in evaluations of medical interventions has shifted to health-related quality of life. The combined impact of mortality and morbidity resulting from injury is, however, largely unknown, but it can be quantified with the help of the disability-adjusted life year (DALY) methodology, developed by WHO and the World Bank.[5] This methodology assesses the impact of diseases and injury in terms of years of life lost (YLL) in fatal diseases and years lived with disability (YLD) in non-fatal diseases. The DALY methodology has been used as an assessment approach in the global burden of disease and injury study to set global priorities for health research and to assess global health trends.[5–10]

This tool can help decision-makers set priorities for prevention and evaluates the effectiveness and cost-effectiveness of health-care policies. Its application depends primarily on the availability of representative and valid epidemiological data on diseases and injuries. Previous estimates of injury-related DALYs[1,11] were based on statistical information in various databases of injury mortality and morbidity, which imposes several limitations.[12] The DALY method has not previously been applied to major trauma, probably because combined data systems on fatalities and permanent consequences among survivors are scarce.

The aim of this study was to quantify the burden of major trauma at the individual and population levels in the catchment area of our trauma-care centre in the Netherlands in the years 1999–2000. We investigated the impact on health in terms of burden of injury, YLD, YLL and DALYs.

Patients and methods

Patients

The study was done at the University Medical Centre Utrecht (UMCU), in cooperation with the Utrecht Regional Ambulance Services. The UMCU is one of 10 level-1 trauma hospitals in the Netherlands, with a catchment population of 1.1 million with a population density of 813 inhabitants per square kilometre. Level-1 is a certification of the hospital about the circumstances and skills for treating all kinds of trauma patients. All severely injured survivors in the province of Utrecht (i.e. an administrative part of the Netherlands with its own regional board of governors) are transported to this trauma centre. Utrecht is in the middle of the country in an urban-rural region. The comprehensive registration required for the study, would not have been possible in many other trauma centres.

Over two years (January 1999 to January 2001) data on all non-natural deaths (prehospital, in-hospital and post-hospital) in the region were collected, in cooperation with forensic medicine specialists and representatives of the justice department. This database provides validated personal and medical data (e.g. after autopsy) about the circumstances of the injury, injury localization and cause of death. In addition, all survivors over the age of 15 years with an injury severity score[13] higher than 15 were approached one year after the injury. The cut-off point of 15 is an international accepted standard by trauma surgeons.[13] Patients with an injury severity score greater than 15 are defined as survivors of major trauma, an injury severity score of 75 is counted as unnatural deaths. The study protocol was approved by the medical ethics committee of the UMCU.

Outcome assessment

We used the EuroQol-5D (EQ-5D) as a generic instrument to measure health status. This instrument has been developed and validated in samples of patients from several European countries, including the Netherlands.[14,15] It defines health along five dimensions: mobility, self-care, daily activities (such as work, study, housework and leisure activities), pain or discomfort and anxiety or depression. Each dimension has three levels: no problem, moderate problem or severe problem. In the second part of the EQ-5D, the health status is recorded on a vertical visual analogue scale (VAS), ranging from 0 (worst imaginable health state) to 100 (best imaginable health state). The patients are asked to mark the point on the scale that they felt best reflects their current health state. A utility score (EQus) is calculated from the five EuroQol dimensions, ranging from 1 for perfect health to 0 for death. EQus can be though of as an objective measure of the utility and the EQvas more as a subjective impression of the patient.[16] The EQus was used to calculate an empirically derived disability weight (1-EQus) – i.e. a summary measure of the severity of the permanent consequences of an injury or disorder.[17]

Methods

DALYs are a measure of the health gap that extends the concept of potential years of life lost due to premature death to include equivalent years of healthy life lost due to poor health or disability. To calculate DALYs for a particular cause of disease or injury in a population, the YLL is added to the YLD. In our study, YLL due to mortality from injuries were calculated by average life expectancy for specific ages and sex obtained from the Dutch standard life tables.[18] YLD were calculated for each surviving patient by multiplying the residual life expectancy and the person's loss of ability 15 months after injury.[5]

We used the classification of external causes of injuries established by the WHO,[1] distinguishing between unintentional and intentional injuries. Unintentional injuries are road-traffic injuries, accidental falls, fires, drowning, poisoning and others. It was not possible to assess the consequences of non-fatal drownings and poisonings, because we did not include these patients in our trauma register. Intentional injuries are self-inflicted injuries, homicide or violence and war. This classification is the first step to allow comparisons with the global WHO database on diseases and injuries.

We calculated YLL, YLD and DALYs at individual level (for each patient with trauma) and at population level (per 1000 inhabitants). The former reflects the average impact on an individual, whereas the latter provides information about the burden to society in terms of population health. Calculations were made using Microsoft Office Excel 2003.
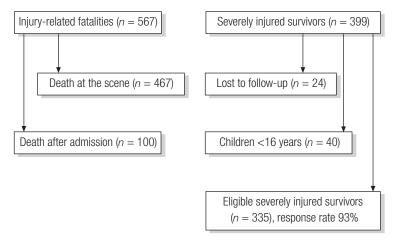
Results

Patient and injury characteristics

Fig. 1 describes the study group consisting of 567 fatalities (355 men, 212 women) and 335 severely injured long-term survivors (249 men, 86 women). The overall mean age of the victims of injury-related fatalities was 48.4 years (standard deviation, SD: 23.3), whereas that of the survivors was 37.7 years (SD: 17.1). Follow-up assessment took place between 12 and 18 months after trauma [with a mean of 451 days (SD: 47)]. The mean utility score was 0.69, with a standard deviation of 0.30, and 83 patients reported no limitations. One third of injuries were intentional. There were twice as many fatalities after self-inflicted injuries (suicide) than after road-traffic injuries. Twice as many men were involved in major trauma than were women (Table 1). Falls frequently caused fatal injuries, especially among women.

Impact of major trauma at individual level

Combining all injuries, the mean number of YLL per patient after fatal trauma was 32, while the mean number of YLD per patient was almost 12 (Table 2). We found a mean of 25 DALYs lost for each patient. Intentional injuries resulted in substantially more DALYs (34 DALYs) per patient than did unintentional injuries (21 DALYs), while falls resulted in much lower than average YLL and YLD per patient, and homicide and violence,

Fig. 1. **Flowchart of the injury-related fatalities and response of the severely injured patients (ISS >15) admitted to the University Medical Centre Utrecht from January 1999 to January 2001**

ISS, injury severity score.

as well as drowning, caused far higher than average YLL per patient.

Impact of major trauma at population level

For our trauma region, major trauma caused 10 DALYs per 1000 inhabitants per year (Table 2). Slightly more than 80% of DALYs were due to fatalities and just below 20% were caused by permanent disability among survivors. Road-traffic injuries were the major (40%) contributor to DALYs, due to the effect of high numbers of both fatal and nonfatal cases. Suicide and self-inflicted injuries ranked second, because they were the biggest cause of mortality. The population health burden of injuries, in terms of DALYs per 1000 inhabitants is characterized by large variation by type of injury and age (data not shown). Road-traffic injuries showed a peak among adolescents and young adults (15–30 years) with a level of almost 24 DALYs per 1000 inhabitants among 15–19 year olds. Self-inflicted injuries and violence were concentrated at somewhat older ages (20–50 years) with the highest level (19 DALYs per 1000 inhabitants) among the 45–49 years old. DALYs per 1000 inhabitants were highest among the (very) elderly (7 DALYs per 1000 inhabitants among people aged more than 80 years). We were able to break down the absolute numbers of DALYs in our region into three components: YLL due to on-scene mortality, YLL due to in-hospital mortality, and YLD due to permanent functional consequences among survivors (data not shown). For road-traffic

injures, the proportion of DALYs caused by on-scene mortality was one-third (primary YLL). Another third were related to in-hospital mortality (secondary YLL). The remainder were related to those surviving major trauma (YLD). The same tendency was observed for falls, but not for self-inflicted injuries, where mortality at the scene was responsible for most (90%) of DALYs, and YLD (2%) hardly contributed to the burden of injury.

Impact of road-traffic injuries

Table 3 shows the differences in impact of the various types of traffic participants, both in absolute numbers of YLL, YLD and DALYs and expressed in DALYs per 1 billion km travelled. The

road-traffic subgroup consisted of 151 fatal cases (111 men, 40 women) and 236 severely injured long-term survivors (173 men, 63 women). The overall mean age of the injury-related fatalities was 39.5 years (SD: 33.7), while that of the survivors was 35.8 years (SD: 31.5). There were almost three times as many men as women among both those that died and those that survived. Table 3 shows that car crashes produced the highest absolute numbers of YLL, YLD and DALYs, although the number of DALYs per 1 billion km travelled was below the average of all modes of transport. Car crashes contributed more than 50% of the YLL, 40% of the YLD, and 48% of the DALYs due to the high share (72%) in kilometres travelled with

Table 1. **Fatalities and survivors after major trauma categorized on the basis of the WHO classification of external causes of injury, in the Utrecht region, the Netherlands, 1999–2000**

Category of major trauma	Fatalities (*n* = 567)		Survivors (*n* = 335)	
	Women	**Men**	**Women**	**Men**
Unintentional	120	204	83	232
Road traffic	40	111	63	173
Falls	66	54	18	42
Fire	3	3	–	–
Drowning	5	18	1	–
Poisoning	3	3	–	–
Other unintentional	3	15	1	17
Intentional	92	151	3	17
Self-inflicted	78	128	2	6
Homicide and violence	14	23	1	11
Mean age (SD)	54.4 (26.4)	44.6 (20.4)	41.0 (19.1)	36.6 (16.3)

SD, standard deviation.

Table 2. **Burden of injuries categorized on the basis of the WHO classification of external causes of injury per patient and per 1000 inhabitants, in the Utrecht region, the Netherlands, 1999–2000**

Category of major trauma	Individual level (per patient)			Population level (per 1000)		
	YLL	**YLD**	**DALYs**	**YLL**	**YLD**	**DALYs**
Unintentional injury	30.6	11.3	21.1	4.5	1.6	6.1
Road traffic	39.5	11.5	22.5	2.7	1.2	3.9
Falls	16.2	10.9	14.4	0.9	0.3	1.2
Drowning [a]	38.3	–	38.3	0.4	–	0.4
Other unintentional	37.2	9.1	25.1	0.5	0.1	0.6
Intentional injury	34.8	18.1	33.6	3.8	0.2	4.0
Self-inflicted	33.2	33.6	32.7	3.1	0.1	3.2
Homicide and violence	44.1	16.6	35.8	0.7	0.1	0.8
All injuries combined	32.4	11.7	24.7	8.3	1.8	10.1

DALYs, disability-adjusted life years; YLD, years lived with disability (survivors of major trauma); YLL, years of life lost (fatalities due to external causes of injury).
[a] Nonfatal drowning was not registered as major trauma.

this mode of transport. Crashes of two-wheeled motor vehicle crashes, however, resulted in by far the highest number of DALYs per 1 billion km travelled, resulting in almost one quarter of the absolute number of DALYs despite this mode of transport accounting for a very low share (1.5%) of the total kilometres travelled.

Discussion

The aim of this study was to assess the impact of major trauma on health at the individual and population levels in our trauma care region in the Netherlands. At individual level, trauma fatalities (32 YLL per patient) and nonfatal major trauma (12 YLD per patient) both led to a substantial loss of healthy life years. Each person with major trauma contributed an average of 25 DALYs to the burden of disease. At population level, major trauma caused 10 DALYs per 1000 inhabitants.

The strongest feature of our study was the use of the population-based regional registry of fatal and non-fatal injuries after major trauma, which was initiated by one of the coauthors.[19] This registration system was implemented over the years 1999 and 2000, in cooperation with the regional ambulance services, forensic doctors, the local justice department and all hospitals in the Utrecht trauma-care region. Tremendous efforts by many co-workers have led to a validated and almost complete regional data set on unnatural causes of death. Another strong feature was the use of individually derived disability weights, collected in a prospective cohort study with a high (93%) response rate among the survivors.[20]

The study was, however, subject to some limitations, such as the fact that children below the age of 16 years were excluded from the survivors. This exclusion was due to the lack of well validated instruments for measuring quality of life among children at the time of our study. There is still no consensus on this topic, although recent studies have shown that children more than 5 years of age could have been included as well and measured with the same instrument.[21] Another potentially debatable issue is our assumption that outcome measurements at an average of 15 months after the injury represent a lifelong situation. However, studies in the United States of America (USA), the

Table 3. **Burden of major trauma (DALYs per 10^9 km) resulting from road accidents (*n* = 387) by mode of transport, 1999–2000**

	YLL	YLD	DALYs	Travelled (10^9 km)	DALYs per 10^9 km
Pedestrian	504	134	638	0.5	1276
Bike	1146	370	1515	2.0	758
TMV	1007	1041	2048	0.4	5120
Car	3089	1103	4193	19.4	216
Others	217	81	297	4.2	71
Total	5963	2729	8775	26.6	330

DALYs, disability-adjusted life years; TMV, two-wheeled motor vehicle; YLD, years lived with disability (survivors of major trauma); YLL, years of life lost (fatalities due to external causes of injury).

United Kingdom and the Netherlands found no further improvement in functional activity after major trauma between 12 months and 18 months of follow-up,[22–24] which supports our decision. A third debatable issue is the use of the EQ-5D, because it lacks a cognitive dimension, and thus underestimates the impact on the quality of life of patients with brain injury. This limitation, together with the exclusion of children means that our estimates of YLD and DALYs due to major trauma are probably somewhat conservative. To assess the extent of this underestimation we made some additional calculations. First of all, we estimated YLD among children below 16 years of age with major trauma (*n* = 40 in our sample), assuming the same average utility loss (1-EQus) as youngsters 15–19 years of age, leading to an additional 700 YLD. Second, we compared our data on loss of ability in patients with brain injuries (because of lack of the cognitive dimension of the EQ-5D) with disability weights obtained in a panel study.[25] This showed an underestimation of 0.06 per patient with brain injury, and an underestimation of 150 YLD among all patients with brain injury (*n* = 181) in our sample. Our additional calculations show that we missed 850 YLD (0.2 per 1000 people), which means an underestimation of 20% of the YLD, or 4% of the DALYs.

Our study focused on long-term consequences of patients with major trauma (injury severity score > 15) and made prior exclusions of patients with injury of low to moderate severity. We compared our results with a European study (including the Netherlands)[26] on the burden of injury with broader inclusion criteria. This European study included all admitted and emergency care patients, and contrary to our study,

included short-term disability as well. By applying this broader scope a YLD rate of 3 per 1000 inhabitants was found in the Netherlands. In our study focusing only on the long-term consequences of major trauma (injury severity score > 15), a YLD rate of 1.8 per 1000 inhabitants was observed. This finding puts our results on YLD into perspective, showing the importance of major trauma.

The global burden of disease and injury study in 1996, which led to global priorities for health research and to assess global health trends,[5–10,27] was a milestone in the development of summary measures of population health, as it established a single set of several hundred disability weights relating to 107 disorders, using the same evaluation method.[5] One of the main findings was that injuries are among the leading causes of death and disability for both sexes in high-income countries.[1] Road-traffic injuries were the 10th most important cause of death and the ninth most important cause of the burden of disease; they were followed closely by self-inflicted injuries, falls and interpersonal violence. In the Netherlands, road-traffic injuries and home and leisure injuries have also been shown to contribute greatly to the burden of disease.[25] In both, this Dutch study and the global burden of disease and injury study, the YLL were dominated by diseases of the circulatory system and by neoplasms, while the YLD were mainly caused by neuropsychiatric disorders. These three leading causes of DALYs represent 60% of the total burden of disease in the Netherlands. The same pattern has been found in the first study on burden of disease and injury carried out in Australia in 1996.[9,10] Our study calculated that major trauma contributed 10 DALYs per 1000 inhabitants

at population level, which is lower than ischaemic heart disease (17 per 1000 inhabitants), comparable with cerebrovascular accidents and chronic lung disease, and higher than depression (7 per 1000), diabetes (6.5 per 1000), and almost equal to the sum of road-traffic accidents (4.7 per 1000), suicide (3.3 per 1000), and home and leisure accidents (2.8 per 1000).[11]

A straightforward comparison of the results with the global burden of disease, the Australian and the Dutch studies is still difficult, as they used different disease classifications and different data presentations (absolute numbers or percentages). Researchers should try to standardize their data presentation to improve comparability between studies. As a first standard in this field, we suggest the use of the WHO classification of external causes of injuries. Secondly, we advise the following further distinction of road-traffic injuries: pedestrian, bike, two-wheeled motor vehicle, car, train and others. In presenting the data, YLL, YLD and DALYs should be presented separately, and absolute numbers instead of percentages should be used. In addition, rates per 1000 inhabitants should be presented for all causes and rates per billion kilometres travelled for all separate modes of transport.

This study has confirmed previous findings showing the importance of road-traffic injuries as a public health problem, and has provided new information to the contributions of different types of road user in terms of YLL, YLD and DALYs (both in absolute terms as per 1 billion km). In our Dutch trauma region, in absolute terms the main contributors to YLL, YLD and DALYs resulting from road-traffic injuries were car occupants. Expressed per 1 billion km travelled; however, users of two-wheeled motor vehicles appeared to have by far the highest number of DALYs, more than half of it being caused by YLD. Nowadays, most serious road-traffic injuries are nonfatal. Most victims of major trauma caused by road-traffic crashes reach the hospital alive and have good chances of survival, which holds in particular for crashes involving two-wheeled motor vehicles. Our data indicate that crashes involving both cars (high absolute numbers of DALYs) and two-wheeled motor vehicles (high numbers of DALYs per

1 billion km travelled) need further reductions. If policy measures are taken they should be evaluated in terms of reductions in YLL, YLD and DALYs. Evaluations of road-traffic policies based purely on mortality rates have become insufficient. They should include a measure of morbidity as well, such as that obtained using the DALY method. Detection of significant changes in YLL, YLD and DALYs (both in absolute terms and expressed per 1 billion km travelled) is helpful to assess the effectiveness of road-traffic policies and to define areas for research and further policy.[28,29] Politicians and decision-makers involved in prevention efforts often focus on mortality rates to justify their policies, including those on speed limits, seat belts and safety helmets. But the increasing numbers of patients who survive a severe injury are probably to be found in the group with lifelong disabilities. We quantified this shift from fatalities to chronically disabling conditions with the DALY method, showing that it will result in a net health benefit of almost 21 years per patient saved [loss of 32 YLL per fatality minus 12 YLD per survivor (Table 2)]. It seems clear that this shift will lead to increases in the use of health services and related medical costs. The above shift in road-traffic crashes resembles developments in other fields of medicine. For example, a sharp reduction of the case fatality rate of acute myocardial infarction has led to increasing numbers of patients with chronic heart failure and increasing demands on health care.[30]

Our data show that new investments in road-traffic injury prevention and trauma care are highly needed but also that they will not suffice. In our trauma-care region, suicide and falls are two other major causes of DALYs. Suicide is by far the most important cause of trauma-related mortality in our region, most of its victims (90%) dying at the scene. In the Netherlands, over the past 20 years the suicide mortality rate has been stable at 10 per 100 000 person-years, where the road-traffic injury mortality rate dropped from 10 to 5 per 100 000 person-years. Both these national figures and our regional data show that suicide prevention seems a largely neglected area in Dutch health-care policies. Our regional data provide support for a recent call to initiate a

national suicide prevention plan as a novel public health-priority issue in the Netherlands.[31]

Our regional data show the need of further reductions in the population burden of falls. Similar to people involved in road-traffic injury, most people who have falls reach the hospital alive, and both groups could therefore benefit greatly from improvements in trauma care. A health-policy strategy, combining prevention and care innovations, has in the past been very successful in the reduction of road-traffic and fall-related mortality in the Netherlands[32] and should be continued in the future. Major trauma is an important worldwide public-health problem in young individuals, with in-hospital case fatality rates in the past few decades declining to about 20%.[33] Combining mortality and morbidity in the DALY method potentially improves the evaluation of trauma care. Both the YLL for those dying after arrival at the hospital and the YLD for those surviving with permanent consequences are essential measures of the effectiveness of trauma-care systems, rather than the YLL for those dying on the scene. Continuous regional, or better national, registries should be set up for fatal as well as non-fatal injuries, including their permanent consequences. This would allow improvements in trauma to be measured in terms of YLL, YLD and DALYs.

Conclusions

Both at individual and population levels, major trauma has a large impact on health. Applying the DALY method, we quantified the importance of road-traffic accidents as a public-health problem in the Netherlands, and found a net health benefit of the shift from mortality to disability. Most people severely injured in road-traffic accidents reach the hospital alive and have good chances of survival. The DALY method provides a unique perspective on health that integrates fatal and non-fatal outcomes, while still allowing the two classes of outcome to be studied separately. Injury control policies should aim to further reduce both the number of fatalities and the permanent consequences among survivors. ■

Competing interests: None declared.

Résumé

Poids pour les individus et la population des traumatismes majeurs aux Pays-Bas

Objectif Evaluer l'impact des traumatismes majeurs sur la santé des individus et de la population.

Méthodes On a utilisé les données tirées des registres des traumatismes régionaux, et notamment celles concernant tous les décès par traumatisme et les traumatismes graves non fatals (degré de gravité > 15) survenus entre 1999 et 2000. L'impact des traumatismes mortels a été exprimé en termes d'années de vie perdues (YLL). Celui des traumatismes graves sur les survivants a été formulé en termes d'années de vie vécues avec une incapacité (YLD). Les poids affectés aux incapacités étaient fonctions de la qualité de vie 15 mois après le traumatisme, mesurée par EuroQol-5D. Les années de vie corrigées de l'incapacité (DALY) ont été calculées en sommant les YLL et les YLD.

Résultats On a recensé 567 accidents mortels et 335 accidents non mortels. Au niveau individuel, les décès par traumatisme (32 YLL

par personne), comme les traumatismes majeurs non fatals (12 YLD par personne), ont conduit à une perte substantielle d'années de vie en bonne santé. Chaque victime d'un traumatisme majeur a contribué en moyenne pour 25 DALY à la charge de morbidité. A l'échelle de la population, les traumatismes majeurs ont entraîné 10 DALY pour 1000 habitants. Les accidents de la route ont fourni la principale contribution à la charge de traumatismes majeurs supportée par la population.

Conclusion Les traumatismes majeurs ont un impact massif sur la santé au niveau de l'individu comme à celui de la population. La plupart des victimes gravement touchées des accidents de la route atteignent l'hôpital et ont de bonnes chances de survivre. Dans le domaine des traumatismes, des politiques de prévention et de soins devraient viser à réduire à la fois le nombre de morts et les séquelles durables pour les survivants.

Resumen

Carga individual y poblacional de traumatismos graves en los Países Bajos

Objetivo Evaluar el impacto de los traumatismos graves en la salud individual y poblacional.

Métodos Se emplearon los datos de un registro regional de traumatismos, considerando todos los casos de traumatismos mortales y de lesiones graves no mortales (puntuación de la gravedad > 15) registrados en 1999 y 2000. El impacto de las defunciones se expresó en función de los años de vida perdidos (AVP), y el de los traumatismos graves de los supervivientes, en términos de los años perdidos por discapacidad (APD). La discapacidad se ponderó midiendo la calidad de vida con el cuestionario EuroQol-5D a los 15 meses de ocurrido el traumatismo. Los años de vida ajustados en función de la discapacidad (AVAD) se calcularon sumando AVP y APD.

Resultados Se contabilizaron en total 567 muertes y 335 supervivientes. A nivel individual, las muertes por traumatismo (32 AVP por paciente) y los casos no mortales de traumatismo

grave (12 APD por paciente) provocaron ambos una pérdida sustancial de años de vida sana. Cada víctima de un traumatismo grave contribuyó con una media de 25 AVAD a la carga de morbilidad. A nivel poblacional, los traumatismos graves causaron 10 AVAD por 1000 habitantes. Las lesiones por accidentes de tránsito fueron el factor que más contribuyó a la carga poblacional de traumatismos graves.

Conclusión Tanto a nivel individual como a nivel poblacional, los traumatismos graves tienen un enorme impacto en la salud. La mayoría de las víctimas de accidentes de tránsito con lesiones graves llegan al hospital y tienen bastantes probabilidades de sobrevivir. Las políticas de prevención de los traumatismos y atención traumatológica deberían orientarse a reducir aún más tanto la mortalidad como las secuelas permanentes entre los supervivientes.

ملخص

الأعباء الناجمة عن الرضوح الكبرى على الفرد والمجتمع في هولندا

الهدف: تقييم تأثير الرضوح الكبرى على صحة الفرد والمجتمع.

الطريقة: استخدم الباحثون بيانات مستمدة من سجل إقليمي للرضوح، شملت الإماتات الناجمة عن الرضوح، والمرضى الذين أصيبوا بإصابات وخيمة غير مميتة (درجة وخامة الإصابة > 15)، وذلك في عامي 1999 و2000. وعُبِّر عن تأثير الإماتات بسنوات العمر المفقودة، وعن الإصابة الوخيمة لدى الناجين بالسنوات التي عاشوها في ظل العجز. واعتُمد في تحديد وطأة العجز على نوعية الحياة بعد مرور 15 شهراً على وقوع الإصابة، مقاسة باستخدام استبيان EuroQol-5D. وحسبت سنوات العمر المصححة باحتساب مدد العجز بوصفها مجموع سنوات العمر المفقودة، وسنوات العمر المعاشة في ظل العجز.

الموجودات: كانت هناك 567 وفاة و335 ناجياً. وعلى مستوى الفرد، أدت الإماتات الناجمة عن الرضوح (32 سنة مفقودة من العمر لكل مريض) والحالات غير المميتة للرضوح الوخيمة (12 سنة من سنوات العمر المعاشة

في ظل العجز لكل مريض)، إلى حدوث فقدان كبير لسنوات العمر الصحيَّة. وقد أسهم كل ضحية من ضحايا الرضوح الكبرى في العبء المرضي بمعدَّل 25 سنة من سنوات العمر المصححة باحتساب مدد العجز. وعلى مستوى المجتمع، تسببت الرضوح الكبرى بنسبة عشر سنوات من سنوات العمر المصححة باحتساب مدد العجز، وذلك لكل 1000 من السكان. وكانت حوادث الطرق المرورية هي المسهم الأكبر في العبء الناجم عن الرضوح الكبرى على المجتمع.

الاستنتاج: للرضوح الكبرى أثر صحي جسيم على مستوى كل من الفرد والمجتمع. وإن معظم ضحايا الإصابات الوخيمة الناجمة عن تصادمات الطرق المرورية يصلون إلى المستشفيات، وتتاح لهم فرص جيدة للنجاة. وينبغي أن تهدف السياسات الخاصة بتوقي الإصابات ورعاية الرضوح إلى تحقيق مزيد من الخفض في الإماتات، وفي العواقب الدائمة بين الناجين.

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