

# INJURY PREVENTION AND SAFETY PROMOTION IN THE LOCAL COMMUNITY — 20 YEARS EXPERIENCE FROM NORWAY

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## Предотвращение травм и усиление безопасности в местных сообществах — 20 летний опыт Норвегии

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**Aim:** A multifactorial injury prevention programme started in 1981 and ran for about 10 years in an island community in Norway with a population of about 1000. A study was undertaken to evaluate effects of the programme over a period of 20 years. **Methods:** Injuries were recorded by the one medical doctor on the island several years during the period 1970–2001. The programme was carried out with high intensity from 1981 to 1987. The intensity gradually decreased to a medium level that lasted until about 1994, when it was further reduced to a low level. **Results:** The injury incidence rate was reduced from 17.7% in 1980 ( $N=188$ ) to 9.7% in 1987 ( $N=97$ ) with relative risk reduced to 0.55 (95% CI: 0.44–0.70,  $p<0.0001$ ). In 2001, an incidence rate of 9.6% was observed ( $N=91$ ). An even higher reduction was observed for serious injuries. The age groups 15–24 and 65+ showed the most distinct reductions from 1980–2001 while minor reduction was observed in children (0–14 years). The incidence rate of traffic injuries was reduced by 77% in spite of an increase in the number of motor vehicles. Occupational, home and other injuries were reduced by 38, 35, and 49% respectively. The incidence rates were 2.6–3.0 times higher for men than for women through the 20 years observation period. **Conclusion:** This study indicates that a long-lasting multifactorial community-based intervention in a small community with defined aims may lead to a considerable and long-lasting reduction in injuries.

**Цель.** Программа по предотвращению многофакторных травм была начата в 1981 году и продолжалась 10 лет в одной из островных общин в Норвегии с численностью населения 1000 человек. Целью исследования была оценка эффективности программы за 20-ти летний период. **Методы.** Травмы регистрировались одним медицинским доктором на острове в течение нескольких лет в период с 1970 по 2001 год. С самой высокой интенсивностью программа осуществлялась с 1981 по 1987 год. Интенсивность постепенно снижалась до среднего уровня, что продолжалось до 1994 г., когда она снизилась до низкого уровня. **Результаты.** Число травм сократилось с 17,7% в 1980 г. ( $N=188$ ) до 9,7% в 1987 ( $N=97$ ) с относительным риском снижения до 0,55 (95% CI: 0,44–0,70,  $p<0,0001$ ). В 2001 г. наблюдалось число травм 9,6% ( $N=91$ ). Большое снижение касалось и серьезных травм. Возрастные группы 15–24 года и 65+ показали наиболее заметное снижение в период с 1980 по 2001 г. в то время как у детей (0–14 лет) наблюдалось самое незначительное снижение количества травм. Число травм при автокатастрофах снизилось на 77%, несмотря на увеличение количества транспорта. Производственные, бытовые и другие травмы сократились на 38, 35, и 49% соответственно. Причем у мужчин количество несчастных случаев в 2,6–3,0 раза было больше чем у женщин за 20 лет исследований. **Заключение.** Исследования показывают, что продолжительная многофакторная превентивная программа с определенной целью в маленькой общине может привести к значительному и долгосрочному сокращению травм.

## Background

Injuries are one of the most serious public health problems facing both high-income and low-income countries. Throughout the world, injuries are now a leading cause of death during the first half of the human life span and have grown in relative importance as many diseases have been controlled [1]. In 1990, they were responsible for 10% of world mortality, predicted to increase to 12% by 2020 [2]. Various preventive measures have been used to reduce this part of the global burden of disease. Community based intervention is a promising concept for injury prevention. Some studies have reported significant

reductions between 69 to 14% in targeted injury types [3–5]. Other studies have reported significant reductions of overall injury rates [6–8]. However, an Australian study reported no injury rate reductions, even after years of community based interventions [9].

The preventive strategies employed in community-based interventions are described in the literature [10–11]. Lund and Aarø have provided a model for injury prevention programmes which includes three main categories: attitude, behaviour and structural modifications [12]. A community is defined as a limited geographical area or in a certain social system with common goals and interests, e. g. a work place, large company,

school or ethnic group. The interventions are directed towards the whole population, not only high-risk groups or individuals. Primary health care, hospitals, local authorities, media and organisations (voluntary, private and public) are involved in the interventions. In addition, many different interventions are implemented, and all types of accidents may be targeted. These multifactorial programmes normally last from one to five years.

Reports on community based injury prevention generally fail to identify, through careful analysis, the dominant workable influencing factor(s) or process(es). The following, however, seem to be important for succeeding with interventions: a) long duration — most of the programmes last several years, b) use of many communication channels simultaneously, c) a combination of preventive measures are utilised simultaneously, such as information, training, environmental changes, regulation and enforcement, and price incentives [13].

During 1970–73, a community diagnosis of Værøy and the similar neighbouring island community of Røst, located in Lofoten, Norway was elaborated by the only physician, being responsible for both general practice and public health on the two islands. Rural primary health care in Norway has for more than 100 years been organised in such combined positions. The community diagnosis showed a large burden of injury, defined as one serious enough to be treated by the physician. Inspired by this diagnosis and interested in prevention activities, one of the authors (GT) initiated a community based injury prevention programme. This programme lasted with high and moderate intensity during the 1980-ies, while more reduced in the 1990-ies. After a prevention period of two years (1981–83), the incidence rate of injuries was reduced by 19% [6]. During the 1980-ies this study on injury prevention and safety promotion at Værøy inspired many other municipalities to start similar community-based interventions.

### Aim

The aim of this study is to evaluate the effects of community based injury prevention 20 years after the initiation of the programme.

### Methods

The island of Værøy had a population of 1060 inhabitants in 1980, reduced to 778 in 2001. This is a typical reduction of population from rural to central areas in most countries in the world [14]. The island is located just north of the Arctic Circle in the Lofoten archipelago, approximately 80 kilometres from the Norwegian mainland. In 1980, about 50% of the adult men were fishermen or worked in fish processing plants, activities with high accident risks.

A registration of Værøy injuries was conducted during a 12-month period in 1979–80. Analysis of the

collected data provided a basis for finding high risk groups and injury aetiology in order to make the prevention programme as effective as possible. A follow up registration was conducted in 1982 and 1983. After 1984 different physicians worked on the island. These were, however, instructed and supervised by their predecessor in order to make reliable, representative and valid registrations. More details of the material and methods are described elsewhere (15).

### Results

The first year before the campaign started, 188 injuries among the residents at Værøy were recorded by the local physician. This gives an incidence rate of 177 injuries per 1,000 inhabitants per year. After the prevention campaign started in 1981, there was no reduction in incidence rate for the inhabitants of Værøy until the second year of the programme (1983). The incidence rate was then reduced to 144, a reduction by 19% from 1980-level. By the year of 1987, the incidence rate had been reduced to 97 (reduced by 45%). The relative risk of injuries in 1987 compared with 1980 was 0.56 (95% CI: 0.44–0.70,  $p < 0.0001$ ). In 2001, an incidence rate of 96 injuries per 1000 inhabitants was observed (See figure).

The incidence rate of the serious injuries was reduced considerably and more than the minor injuries, from 57 in 1980 to 28 in 2001, a reduction by 51% (95% CI: 18–71%). All types of injuries among the residents of Værøy treated by the physician were reduced. Traffic accidents were reduced by 77% in 2001, occupational accidents by 38%, home accident by 35% and other accidents by 49%.

The incidence rates are 2.6–3.0 times higher for men than for women. The incidence rate for injuries in men was reduced by 42% and in women by 50% from 1980 to 2001. The reductions were highest in the age groups 65+ and 15–24 years with 65% and 54% respectively, while for children 0–14 years the reduction was 17%.

### Discussion

It has been shown that the injury incidence rate in 1980 for the population at Værøy was similar to the rate found in 1970–73 for the population in Værøy and Røst. A marked reduction in injury incidence rates at Værøy appeared from 1983 to 1987, while in 2001, the incidence rate was similar to the rate in 1987.

The possibility of underreporting of injuries can not be excluded. However, for the years 1979/80, 1982–83, 1985–87 and 2001 the registration is assumed to have a high level of completeness and validity. This is supported by the higher decrease of serious injuries, less likely to be underreported than the minor injuries.

Exposure changes in terms of person years in the denominator could bias the findings e. g. if an increasing

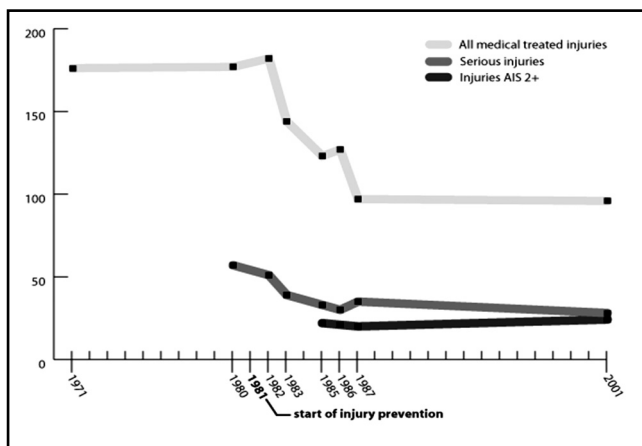


Fig. 1. Incidence rates for all medical treated injuries at Værøy in 1971, 1980–1987 and in 2001, for serious injuries 1980–1987 and 2001 and injuries with Abbreviated Injury Scale (AIS) 2 and more 1985–87 and 2001.

number of Værøy inhabitants travelled away from the island for long periods during the study period. While the number of fishermen fishing in other areas was assumed to be constant, there may have been increase in the number of persons travelling from Værøy for recreational purposes, particularly during the 1990-ies. This travel may have accounted for a small part of the recorded injury rate reduction during the 90-ies. However, it is not considered plausible that this mechanism contributed much to the 45% reduction observed in the 1980-ies.

The decrease in injury incidence rate in the age group 15–24 years from 282 in 1980 to 183 per 1000 inhabitants in 1985 can not be explained by the relative number of students away from home in this period, which was constant. In 2001 however, this proportion was increased and might explain some of the low incidence rate.

The observed injury rate reductions are similar for both genders. This may be an argument for the rate reduction being real, as women are considered to be more stationary on the island than their fishing husbands.

Reductions in injury rates might be explained by changes in the age distribution. Although the population was reduced by 27% during these 20 years, the age distribution was rather constant.

Because of the potential for kinetic energy release at high sea with heavy machinery involved, injuries at sea have higher degree of severity than all other occupational injuries in terms of places of occurrence. Thus, it could be that this fishing community had a very large injury burden in terms of both rate and severity and hence a high potential for prevention which was released when the injury prevention campaign started in 1981. In 1987, the Værøy community attained the same level as other communities in Norway at about 10% [16].

The reduction in traffic injury rates can not be explained by changes in motor vehicle ownership rates on the island. On the contrary, while the number of vehi-

cles increased by 55%, the rate of traffic injuries decreased by 77%.

Occupational injury rates among the population of Værøy were compared with the following exposure confounders: a) the amount of fish landed, b) the number of fishermen registered, and b) the man-labour-years in the fish processing plants at the island. The trends in these three exposure factors are not unequivocal. The downward trend in occupational accidents seemed to follow a steeper slope than the less pronounced downward trend of these three exposure factors.

The relation between the incidence rates for men compared to women are in an average community between 1.5 and 2.0 [16]. In Værøy, this proportion was 2.6 in 1980, increasing to 3.0 in 2001, probably reflecting that Værøy is a fishing society, where the men have been and still are exposed to more dangers than in an average community.

While the interventions directed towards the fishermen seem to have given rather high positive effects, the interventions targeting children seemed less effective. A reason for this discrepancy could be that more structural (passive) modifications were directed towards fishermen and more behaviour-related (active) interventions were directed against children, the former being considered more effective than the latter [12]. Another explanation might be the vacancy of the public health nurse position at the mother and child health clinic during the late part of the 1990-ies.

The reasons for having more or less the same overall incidence rate in 2001 as in 1987 might be due to establishing some structural and lasting prevention measures in the community (See figure). Værøy obtained this level in 1987 and have since probably been influenced by the general preventive activities in Norway in the occupational, traffic, home, school, elderly and kindergarten areas. Værøy is a fishing community that had a high amount of injuries. A specially designed and active prevention programme was launched which contributed in reducing the injuries to the same level as in the rest of Norway, even if the exposure to dangers probably are higher at Værøy than in an average community in Norway. For future studies, qualitative methods could be utilised to better understand the attitudes and behaviour of the people and how they were changed in undertaking prevention measures.

## Conclusions

The results of this study indicate that a long-lasting community-based intervention with defined aims can lead to a considerable and long-lasting reduction in injuries, at least in communities with high incidence rates. The factors associated with the reductions might be the small size of the community, enhancing synergetic effects of a multifactorial prevention method in the local community, and preventive measures tailor-made to the relevant risks.

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