Hepatitis B serum markers and oral health in a group of Norwegian male prisoners

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In 138 male Norwegian prisoners the prevalence of hepatitis B virus (HBV) serum markers was 30.4% and closely related to their drug abuse. The highest frequency of the markers (82.8%) was found in young drug addicts admitting intravenous abuse and the lowest (14.3%) in prisoners denying such abuse. For comparison, the frequency of HBV serum markers in the general male population in Norway is about 4.1%. In young prisoners (<30 years), DMF teeth, percentage of gingival bleeding, and percentage of periodontal pockets >4 mm were on an average 18.8, 38.2%, and 7.0%, respectively. The corresponding figures in the older age group (>30 years) were 21.7, 38.5%, and 15.2%. These findings indicate a dental health status somewhere between that of the general population and disadvantaged groups in Norway previously surveyed. Other oral pathological conditions were present in more than one third of the prisoners, but mucosal lesions and disorders of psychosomatic origin did not extend normal ranges. No characteristic lesions attributable to drug abuse were observed. Dental care was given a low priority by the prisoners. Emergency procedures had been the treatment of choice at infrequent, irregular visits to the dentist, leading to enhanced risk of bleeding and of HBV transmission. □ *DMF; drug abuse; periodontal scores; virus*

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The risk of transmitting hepatitis B virus (HBV) through dental procedures is a matter of concern among dental professionals (1, 2). Recommended practical precautions to avoid transmission in dentistry are time-consuming and have to be restricted to cases of known or strongly suspected HBV carrier state. The recognition of high-risk groups among the dental patients will facilitate the identification of HBV carriers.

In a recent study (3) serological markers of hepatitis B (HBsAg and anti-HBs) were detected in 28.8% of male prisoners committed to prison in Norway. This is a higher frequency than found in the general population (4) but lower than previously found among drug addicts (5) in the country. The addicts are considered a risk group. A high proportion of drug abusers among prisoners has been reported (6). The influence of and the desperate need for psychoactive drugs often lead to criminal acts, which sooner or later result in imprisonment. Among several medical disorders frequently encountered in drug addicts, hepatitis B seems to be the most predominant (7, 8), but a relatively high frequency of hepatitis A and hepatitis non-A non-B has also been reported (9). The sharing of injection device, close contact with fellow addicts, and a general lack of hygiene may be responsible for this. Abusers taking drugs perorally are also reported to have high incidence of viral hepatitis, although lower than that of intravenous abusers (10).

The importance of high hepatitis B prevalence groups as a source of HBV transmission in dentistry depends on the frequency of visits to the dentist and on the oral health status. Procedures causing bleeding represent increased risk of transmitting HBV (11). Little information about these factors among prisoners has appeared in the literature, but poor dental health comprising dental caries, periodontal disease, and abnormal dental wear in drug addicts has been observed (12).

The aim of this study was to assess the

prevalence of hepatitis B in a group of male prisoners comprising drug addicts and non-addicts, and to assess their oral health status and pattern of utilizing dental services.

Materials and methods

Prisoners

The survey comprised 138 men admitted to a prison in southern Norway during 11 months, and most of them were sentenced to long-term imprisonment. Their mean age was 30 years, ranging from 19 to 62 years. Eighty-four of them were younger than 30 years of age (Table 1). Eighty-one per cent of the prisoners came from urban areas, and 88% belonged to social group III on the basis of the following criteria: I, professionals and executives; II, white-collar employees and foremen; and III, workers and unemployed at detention.

Interviews

Semi-structured interviews were carried out following predetermined reply alternatives. Inquiries were made about previous health, particularly experience with hepatitis, drug and alcohol abuse, and blood transfusions. Furthermore, the prisoners were asked about access to and utilization of dental services, reasons for possible irregularities in dental check-ups, subjective judgement of present oral health, estimates of dental care needs, and knowledge about and attitudes towards dental care and oral hygiene. Temporomandibular joint (TMJ) disorders were also included in the questionnaire.

Viral hepatitis assays

Ten milliliters of venous blood were drawn from each participant, and the serum was separated and stored at −40°C until tested for viral hepatitis markers by commercial solid-phase radioimmunoassays. The following tests were performed: Hepatitis B surface antigen (HBsAg) was determined by Hepria-B (RIA International Inc., Miami, Fla.), antibody to HBsAg (anti-HBs) by Hepab (RIA International Inc.), antibody to hepatitis B core antigen (anti-HBc) by CORAB (Abbott Laboratories, Langen, FRG), hepatitis B e antigen (HBeAg) by Abbott-HBe (Abbott Laboratories), and antibody to HBeAg (anti-HBe) by Abbott-HBe (Abbott Laboratories), used as a competitive radioimmunoassay after blocking the test sera by a neutralizing HBeAg-containing serum.

Oral examination comprised clinical assessment of dental caries, restorations, and missing teeth in accordance with the WHO recommendations (13). Gingival and periodontal conditions were recorded by the observation of gingival bleeding after probing and by pocket depth measurements. Mesial and vestibular aspects of all maxillary teeth and mesial and lingual aspects of all

Table 1. Presence of hepatitis B serum markers in relation to age of 138 prisoners

	Drug abuse				
	Admitted		Denied		
Serum markers	<30 years	≥30 years	<30 years	≥30 years	Total no.
HBsAg	8	0	2	1	11*
Anti-HBs	14	2	3	2	21
Anti-HBc	24	2	3	3	32
Any HBV marker	29	2	5	6	42
None	22	8	28	38	96
Total	51	10	33	44	138

* Four were HBeAg-positive and four anti-HBe-positive.

Table 2. Dental caries, (Dt), missing teeth (Mt), DMFt index, gingival bleeding, and periodontal pockets (≥4 mm) in Norwegian prisoners less than 30 years of age

								Bleeding		Pockets	
Abuse	Number	Dt	SD	Mt	SD	DMFt	SD	%	SD	%	SD
Drugs	32	6.0	4.7	3.0	4.7	19.0	4.6	30.9	23.0	8.1	13.5
Alcohol	18	7.7	4.3	3.9	4.9	19.4	4.6	50.7	18.0	6.3	6.7
Both	17	6.0	4.5	2.3	2.6	18.8	5.1	40.3	23.1	6.8	6.2
Denied	10	3.9	2.5	4.4	4.6	17.0	7.2	35.3	25.4	5.4	7.6
Total	77	6.1		3.2		18.8		38.2		7.0	

mandibulary teeth were examined. Third molars were excluded. Bleeding surfaces and pocket depths of 4 mm or more were recorded and presented as percentages of the total number examined to express the degree of gingivitis and periodontitis, respectively.

Degree of dental attrition was recorded on a scale of I–IV, prosthetic appliances by type and extension, and oral surgical and oral medical disorders by diagnosis and location. Special attention was focused on lesions of possible psychosomatic etiology or influence.

All data obtained were coded for electronic data processing and transferred to a computer.

Results

Serum samples were obtained from all of the 138 prisoners. The distribution of hepatitis B markers is presented in Table 1. Serum markers were detected in 30.4% of the prisoners, with the highest frequency in young drug abusers—56.9%, as compared with 14.3% in those who denied abuse. In young addicts taking drugs intravenously the frequency was 82.8%. Only one third of those positive for HB markers had experienced jaundice. Of the 11 HBsAg-positive sera 4 were also positive for HBeAg and 4 for anti-HBe.

During the 11 months of investigation no case of acute viral hepatitis occurred among the inmates or the staff members of the prison.

Illicit drug use was admitted by 61 prisoners, 51 of them younger than 30 years of age. Drug abuse had lasted for more than 2 years in 42 cases, for less than 2 years in 7 cases, and in 12 cases duration was not stated. Twenty-nine men admitted intravenous drug abuse. Whereas drug abuse was a problem predominantly among the young

Table 3. Dental caries, (Dt), missing teeth (Mt), DMFt index, gingival bleeding, and periodontal pockets (≥4 mm) in Norwegian prisoners 30 years of age or older

								Bleeding		Pockets	
Abuse	Number	Dt	SD	Mt	SD	DMFt	SD	%	SD	%	SD
Drugs	4	4.8	2.1	6.0	4.2	23.1	3.7	38.4	12.7	26.3	20.7
Alcohol	17	7.8	5.9	8.0	5.2	21.6	4.5	35.1	17.9	10.0	9.1
Both	5	3.8	3.8	10.4	12.4	20.8	8.3	47.3	34.1	31.4	26.3
Denied	21	6.0	4.1	7.3	4.9	21.7	4.6	39.2	18.3	14.5	9.3
Total	47	6.3		7.8		21.7		38.5		15.2	

prisoners, alcohol problems were more evenly distributed, prevailing in about 45% of both age groups. Thus, abuse of drugs and/or alcohol was stated by 87% of the young prisoners and by 55% of the older.

In 13 cases interview and oral examination were refused, and 1 prisoner was excluded because of his ethnic background. Most of the remaining subjects had received regular dental service during elementary school, generally once a year. Later on, however, this was discontinued, and at the time of examination only 20% of the men claimed to see their dentist regularly at least every 2nd year. All the others saw their dentists occasionally, most often in cases of emergency, and 11 men had not received any dental care since school. The dental neglect was evenly distributed between the age groups, but was slightly worse among the drug and alcohol abusers than among the others. The reasons claimed for the dental neglect were most often 'bad financial condition', 'dentistophobia', or 'carelessness'.

Dental caries, expressed as DMF teeth, and gingival bleeding and periodontal pocket formation, included as main parameters of oral health, are presented in Tables 2 and 3. The oral health conditions were worse in the older age group than in the younger one, particularly with regard to missing teeth and pocket formation. However, in the present material a relatively high proportion of the missing teeth were lost in fights and accidents. DMF teeth value was lowest in younger prisoners denying abuse, but otherwise differences between the groups were insignificant.

The frequency and severity of tooth attrition were large but were evenly distributed among drug abusers and the others. In several cases fractures of the incisal edge, corners, and cusps were caused by trauma, comprising activities such as opening of beer bottles with their teeth.

Ten per cent of the prisoners had experienced pain in the TMJ, and 20% had observed joint clicking. Pain had been transient in all cases, even in a young prisoner with a less than 1-year-old untreated bilateral condyle fracture. None of the prisoners had sought professional treatment or advice for their TMJ symptoms.

Knowledge of gingival/periodontal symptoms and the connection between oral hygiene and periodontal health was poor. The frequency of toothbrushing varied and in many cases increased during the stay in prison.

Oral pathoses other than dental caries and marginal periodontitis were present in more than one third of the prisoners, but without correlation to age or abuse. The most frequent lesions were draining fistulas and dentoalveolar abscesses, impacted third molars, benign tumors, and post-traumatic discoloration of teeth. The frequencies of some mucosal disorders are listed in Table 4. In addition, single cases of denture stomatitis, angular cheilitis, white sponge nevus, oral petechiae, cicatrices after severe injury to the jaws, and oro-antral fistulas occurred.

Table 4. Occurrence of some mucosal disorders in male prisoners (in per cent)

	Prisoners	Control*
Lichen planus	2.4	1.6
Stomatitis aphthosa	1.6	2.0
Herpes labialis	0.8	3.1
Lingua geographica	2.4	8.5
Lingua villosa	2.4	0.8
Leukoplakia	1.6	6.1
Morsicatio buccarum	5.6	5.1

* From a Swedish investigation of 20,000 individuals more than 15 years of age (18). The prevalences in males are given.

Discussion

The increasing proportion of prisoners who are drug addicts reflects the growing importance of drug abuse as a cause of crime. In this study nearly half the inmates of a Norwegian prison admitted drug abuse. The two groups, drug abusers and non-abusers, were comparable in size and with regard to socioeconomic and geographical background but differed in age distribution. The low incidence of drug abuse in the older compared with the younger prisoners may be due to subsequent elimination by death from over-

doses, concurrent disease, or accidents but fortunately also by rehabilitation (14). No evidence occurred to question the reliability of the statements about drug abuse of those who denied abuse.

The viral hepatitis assays disclosed a high hepatitis B prevalence. As was expected, the frequency of HBV serum markers was closely related to drug abuse and particularly to parenteral drug administration. The exposure rate in young addicts taking the drugs intravenously was in accordance with the results of an earlier investigation in Norway (5). However, prisoners denying abuse of drugs also showed a higher frequency of HBV markers (14.3%) than Norwegian men in general (4.1%). This may reflect close contact between the two groups of prisoners also outside prison. No differences in frequency of HBV serum markers were observed between prisoners who denied taking drugs but admitted alcohol abuse and those who denied both stimulants.

The infectiousness of HB among the prisoners is indicated by the presence of HBeAg in four of the sera positive for HBsAg. However, another three HBsAg carriers negative for HBeAg and anti-HBe were considered highly infective, whereas four carriers positive for anti-HBe were recorded as low-risk cases. In spite of the high rate of carriers, transmission of HBV resulting in disease did not occur during the investigation. This may be due to an adequate level of general hygiene in the prison and to awareness among the staff.

Of less concern in dentistry, but otherwise noteworthy, is the high rate of exposure to hepatitis A infection in the young group of prisoners (43%) and particularly in drug abusers (55%) compared with the general population of Norway below 30 years of age (less than 10%) (unpublished data). No distinction between IgG and IgM antibody to HAV was made in this study, but no evidence of ongoing or recent HAV infection appeared. The results confirmed a previous finding of increased risk of HAV infection among addicts (9), to a large extent also comprising alcohol abusers and apparently criminals as well. Neglect of hygiene in these groups, close contacts, and a high proportion of silent or mild, untreated infection may be responsible for these findings.

Dental and gingival health in the prisoners was not good, but the DMF values, percentage of gingival bleeding, and pathological pockets (Tables 2 and 3) were lower than reported in earlier studies of dental health in disadvantaged populations in Norway (15, 16). No correlation was found between drug abuse and dental caries, and no specific, characteristic lesions attributable to drug abuse were observed. The general dental neglect amply explained the D and M scores in this material; 102 out of 124 prisoners had not seen a dentist for years except for emergencies and had to be classified as 'dental drop-outs'. The reason why these scores were not even worse is probably the benefit of regular dental surveillance and care by the public dental services during childhood.

Oral pathoses detectable by clinical examination seemed more prevalent in the prisoners than generally seen in the Norwegian population, particularly sequelae of trauma and dentoalveolar infection. The discussion, however, is hampered by the lack of a matching control material. Noteworthy is the scarcity of lesions of psychosomatic etiology or influence, such as lichen planus, aphthous stomatitis, and labial herpes, considering the stressing events the men had been through; crime, detention, custody, process, conviction, and jail. These kinds of emotional stress are apparently not likely to trigger psychosomatic mechanisms, or they may be counterbalanced by the use of psychoactive drugs or alcohol. TMJ symptoms were also observed in frequencies comparable with those of other groups studied (17), with a probably exception of experienced TMJ pain, the somewhat higher frequency of which could be attributed to a higher rate of jaw traumas.

In conclusion, prisoners represent a potential risk of HBV transmission in dentistry, a risk that is enhanced by frequent gingival bleeding and by the emergency type of treatment often required, also likely to cause bleeding. This calls for awareness in prison dentistry and among dentists otherwise dealing with prisoners. Generally, personnel at risk should be regularly screened for HBV

markers. Moreover, this group of dental health personnel should be taken into consideration when priority groups for hepatitis B vaccination programmes are discussed. Practitioners only occasionally encountering these patients should require evaluation of HBV serum markers of the patients before treatment if possible; otherwise due precautions should be taken.

Generally, prisoners should be encouraged to improve their dental health during their stay in prison, by dental health education and oral hygiene instruction. Furthermore, oral rehabilitation may be a valuable support in the general rehabilitation of these individuals.

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