

Summary of review:

Dietary intake of IVDU's.

There have been little papers looking at the dietary intake of IVDU's, and furthermore little comparison to the general population of similar age and socioeconomic status.

Energy intake

There have been varying reports on energy intakes in IVDU's with and without HIV. An observational study by Kim et al showed IVDU's were less likely to meet RDA's for micronutrient and energy compared to non IVDU's. The reason for this identified in a multivariate analysis as the only independent correlate of inadequate intake was dieting deliberately to lose weight (Kim et al)

In contrast another study showed that energy intakes in IVDU's were high, with Males 3853Kcals/day and females 2480Kcals/day. (Peck)

A cohort study by Smit showed HIV positive consumed higher calorie intake than HIV negative although this was not statistically significant, compared with estimated calorie requirements. Total intake exceeded needs, However self reported involuntary weight loss of more than 10lbs during the prev 6 months was noted in 5% of HIV- vs 16% of HIV+. Males consumed a higher intake of total Calories, $P \leq 0.005$ and most other nutrients than females (Smit). However a study by

Looking at number of meals eaten a study showed that 14% of the cohort consumed 1 meal or less, 47% reported 2 meals and 39% reported consuming >3 meals.(Smit)

In IVDU's men have more Kwashiorkor type (protein depletion) malnutrition whereas women have more marasmus (energy depletion) type (summary review Noble % McCombie)

Protein intake

Mixed reports on protein intake.

Milk seemed to be the main source of protein eaten in many clients, and general protein intake was low. (Peck)

Clients on methadone had diets high in dairy produce, esp milk, milk shakes, cheese and yoghurt but low in frt and veg. (Noble etc)

Protein intake was higher among current drug users than non users (120v92g, $p=0.05$). Protein and fat intakes were lower in those who participated in a drug or alcohol treatment program in the previous 6 months $p \leq 0.02$ (Smit). Median protein intakes were significantly higher in HIV+ than HIV- but the significance disappeared when expressed as % of total energy intake ($p=0.5$) (Smit)

Micronutrient intake

Fruit and veg intake was low in IVDU's, however some clients ate a large amount of these, the main fruit intake was in the form of fruit juice. (Peck).

Use of PI or HAART associated with a higher nutrient intk of Vit C (Kim et al)

Intakes of pantothenic acid and selenium were higher among HIV+ than HIV- as too were absolute intakes of Vit B², B¹² and phosphorus. Intakes of these nutrients in both groups were close to or exceeded the RDA. In drug users, Zinc and Vit E were higher in drug users (12.9v8.8mg zinc; 6.9v3.4mg Vit E p<=0.03) (smit)

Factors affecting different intake:

Various factors affected dietary intake:

Socioeconomic factors had a large influence with Higher household income and greater education was associated with higher dietary intake (Kim et al).

Drugs also had an influence, as it was shown that individuals tended to eat after taking drugs (midday most popular time) with feelings of hunger and less nausea/abdominal distension which is relieved after taking drugs. (Peck)

The amount of money spent on drugs far exceeded that spent on food. Food was often stolen in a response to hunger (peck)

Number of drugs affect nutritional status with poorer status in those with more severe drug use and more than one drug (Noble and McCombie.)

Looking at HIV status affecting intake, two papers were quoted to show no difference between the HIV positive IVDU and HIV negative IVDU with regards to nutritional status (Gomez-Sirvent et al 1993, Varela et al 1990) as in Noble & McCombie.

The social support individuals received or gave also affected dietary intake. Minorities, dependant children, adult care giver, food shopping assistant, affected dietary intake and those with less support had less dietary adequacy (Kim et al). Eating was supported by benefit cheques obtained, parent and friend support, night shelter or hostel or day centre facilities were the main source of food provision. Meals were described as solitary or anxious eating time either eating alone or amongst people they didn't know (Peck).

Survival and hunger were the main motivators to eating (Peck). Eating patterns varied in amounts, as a result of drug use and food availability (Peck)

The main reason people didn't cook for themselves was due to not having access to cooking facilities. Food acquisition was from corner shops or local access and supermarkets, which may be expensive on the whole (Peck)

People who work with drug users have identified the need for training and ongoing support in food and eating issues of this client group. Some workers identified that they took for granted that poor nutrition came with IVDU and did not address this with their client whereas others were keen to incorporate it into their work however did not feel they had enough knowledge and skills to do so. (Peck)

Different food types/popular food groups:

The main contributor to energy intake is sugary foods and those containing fat and sugar. Starchy CHO intake was low as was NSP intake (Peck) Higher intake of refined CHO with increase report of dental caries due to poor oral hygiene (Noble etc). Sugary foods are taken more so prior to using drugs whereas after taking drugs more food in total was consumed with a broader nutrient content. (peck)

Total CHO intake was similar between HIV positive and HIV negative, the percentage of total calories from CHO was significantly higher in HIV positive ($p=0.05$), HIV positive tended to consume more sucrose and sugar. Median fibre intake was less than 10g in all groups (Smit).

According to 24hr recall HIV positive group had higher intake of foods from meat ($p\leq 0.05$) and fat ($p\leq 0.01$) than HIV -. Males consumed a higher number of servings from bread and cereal group than females. Other food groups were similar for HIV positive and HIV negative males and females.

Looking at number of meals eaten a study showed that 14% of the cohort consumed 1 meal or less, 47% reported 2 meals and 39% reported consuming >3 meals. (Smit)

Summary/conclusion

The intake of IVDU's appear to be similar whether they are HIV positive or negative. Dietary intake is a complex social behaviour which is affected by many variables including attitudes to food and food choices/patterns, economic and lifestyle factors. (Kim et al)

More work is needed to understand the implications of dietary habits, nutritional status and counselling as it relates to the disease progression in HIV positive IVDUs (Smit) Adequate intakes are important to prevent deficiencies that may compromise immune function.

Advising individuals to increase the number of meals/snacks could assist in maintaining or increasing energy intake and prevent weight loss especially among HIV positive individuals (Smit).

- Dietary advice should be based on cheap, convenient and easy to prepare, familiar foods, small frequent snacks which are nutrient/energy dense, take away foods if affordable, tinned, frozen and packet meals. (Noble etc)
- Aiming for a balanced diet within individuals ability to do so
- Training health care workers appears to be paramount in helping individuals achieve dietary goals. Working together can make a big difference but the health care worker needs to be aware of important food issues and be able to advise and help achieve balanced diets.
- More work is needed to understand the implications of dietary habits, nutritional status and counselling as it relates to the disease progression in HIV positive IVDUs (Smit)

References:

Smit et al 1996; 'Dietary intake of community-based HIV-1 seropositive and seronegative injecting drug use', Jul-Aug;12(7-8):496-501

Kim J. H. et al. 2001; The Correlates of dietary intake amongst HIV-positive adults; Am J Clin Nutr: 74: 852-61

Noble C & McCombie L 1997. Nutritional considerations in intravenous drug misusers: A review of the literature and current issues for dietitians. J Human Nutrition and Dietetics. 10(3): 181-191

Peck K, The food and nutrition related health needs of people involved in drug use and crime in Leeds; 2000; Leeds Health Action Zone, Department of Health ; www.haznet.org.uk

Body Composition & dietary intake in HIV positive drug users - Summary of review

Body Composition

There are inconsistencies in how body composition is measured. Tools used include Height, Weight, BMI, bio-impedance, DEXA. Methods are not always fully discussed.

Forrester et al found no difference in body composition & weight in male drug users

The same study found female IVDU with HIV infection had lower weight, lower BMI and lower fat mass than female non-drug users despite higher energy intakes.

Drug Use

There are problems when comparing studies on drug use and effect on HIV wasting as different authors use different classifications of drug use. 1 study (Forrester et al) classifies marijuana as non-drug use due to its positive impact on appetite. Others do not specify types of drug, frequency of drug taking and whether IVDU is current or in the past.

Some studies acknowledge a tendency to under-reporting of drug use.

Campa et al report subjects with heavy cocaine use (>5 days per week) as more likely to experience HIV wasting (not stat sig)

Alcohol

Not all studies specify subjects alcohol intake and there are differences in definitions of heavy alcohol intake (Campa et al define as >1 drink per day).

This study did however find a statistically sig increase in HIV wasting in subjects with a heavy alcohol intake. Alcohol is known to interfere with Energy utilisation & deposition of fat and promotes muscle wasting.

Housing

Forrester et al found homeless people to be less likely to experience HIV wasting than those with permanent housing. They postulate that this may be due to subjects with more advanced disease having better access to housing.

Dietary intake

Dietary assessment methods vary between studies and include 24 hour recall, food frequency questionnaires and food records and mostly they are self reported. All of these methods have limitations when assessing actual intakes, especially with the drug using population.

Forrester et al found higher Energy intakes in female drug users than non users despite evidence of lower weight and postulates that frequent drug abuse may alter Energy requirements.

A study in Spain (Santolaria-Fernandez et al) found lower energy intakes associated with heavy drug use among IVDU (82% heroin) but other studies have not had the same findings (Morabia et al). Heroin use was associated with reduced intakes of fat & protein but higher sucrose & alcohol intakes.

Campa et al found no significant difference in dietary Energy intakes between those who experienced wasting & those who did not. They did however find a significant association between HIV wasting and number of days without any food eaten in the previous month. Even 1 day without food in the previous month increased the incidence of wasting with a greater increase if subjects went 4 or more days without food in the previous month.

Viral Load

Not all studies specified whether subjects were on HAART or not. Campa found subjects who experienced HIV wasting were more likely to be receiving HAART than those with no wasting, although the difference was not stat sig. There were no differences in CD₄.

High VL was also a significant predictor of HIV wasting. As most subjects in this study were on HAART, this indicates poor adherence to HAART.

Conclusion

It is difficult to compare results from the various studies on Nutritional status in drug users with HIV due to the variations in methodology for assessing intake & body compositions, definitions of wasting, classification of drug use, stage of HIV (on HAART or not) etc.

More work is needed in this area before concrete conclusions can be drawn. However from the studies reviewed the variables found to be significant contributors to the development of HIV wasting in drug users are;

- High VL
- Not eating food for 1 or more day in the previous month

- Heavy alcohol consumption

In addition female drug users have lower weights/BMI & fat mass than non users despite having higher Energy intakes so may need additional dietary advice compared to male HIV drug users and non users.

References:

HIV-Related Wasting in HIV-Infected Drug Users in the Era of Highly Active Antiretroviral Therapy

Adriana Campa, Zhifang Yang, Shenghan Lai, Lihua Xue, J. Craig Philips, Sabrina Sales, J. Bryan Page and Marianna K. Baum.

Clinical Infectious Diseases, 2005;41:1179-85

Body Composition and Dietary Intake in Relation to Drug Abuse in a Cohort of HIV-Positive Persons

Janet E. Forrester, Margo N. Woods, Tamsin A. Knox, Donna Speigelman, Sarah C. Skinner and Sherwood L. Gorbach

Journal of Acquired Immune Deficiency Syndromes Vol 25, Suppl 1, October 2000

Nutritional Assessment in Intravenous Drug Users with HIV/AIDS

Smit & Tang

JAIDS , 25:S62-69, 2000

Opiate drug use and Metabolic/Endocrine complications.

Opiate use may have multiple effects on metabolic and endocrine function in the HIV population however this has not been fully explored. Different study types, confounding factors, small sample size, lack of statistical significance, and use of alcohol and other drugs may affect study results. A review article by Cooper et al 2003 summarises some areas of thought.

HIV positive active heroin users had a 32% lower level of Leutinising Hormone which reflected low testosterone activity in a cross sectional study compared with non HIV controls. Hypogonadism can lead to low bone mineral density, and infertility. These can be reversed with the abstinence of heroin use however methadone maintenance may not reverse these effects.

In observational studies heroin use has been associated with abnormalities in glucose metabolism, with higher fasting insulin levels and sustained levels after oral glucose loading. After an IV glucose load, heroin addicts were found to have a 42% lower acute insulin response and an 80% lower glucose disappearance rate compared to controls. This may suggest that exogenous opiates may alter B cell function, or abnormalities in absorption kinetics. The clinical significance of these results remains uncertain.

There has been no studies to determine the effects of heroin on body composition in HIV subjects.

Do heroin addicts have impaired adrenal function? One study found lower plasma cortisol levels in heroin addicts than healthy controls that were concurrent with depressed ACTH levels. Another found a reduced response of cortisol to ACTH stimulation in 5 methadone dependent patients compared with controls, although absolute levels of cortisol were not presented. 2 study's found a small number of HIV patients with a low cortisol level or impaired cortisol response to stimulation.

Heroin use may contribute to low bone mineral density as shown in a study of an 11% reduction in lumbar BMD in heroin users compared to non drug dependant control subjects. The contribution of other factors is unclear.

Heroin users may also have a mild hypothalamic pituitary dysfunction as shown by lower response to growth hormone, however the clinical significance remains unclear.

In conclusion:

In the opiate dependant HIV positive individual, use of heroin or methadone may compound endocrine and/or metabolic abnormalities resulting from HIV or its treatment. The extent of the contribution of heroin or methadone to many abnormalities remains unclear as studies have taken place in small groups or of an observational method only. Nevertheless, It is important to be aware of these factors when assessing IVDU HIV positive patients.

Reference:

Cooper O.B., Brown T.T. and Dobs A.S. 2003; Opiate drug use: A potential contributor to the endocrine and metabolic complications in human immunodeficiency virus disease. Clin Inf Dis; 37(suppl 2): S132-136

Vitamin/Minerals in IVDU

Studies have documented low serum antioxidant levels in many HIV positive populations and these low levels of antioxidants are associated with adverse HIV related outcomes. Little is known of the mechanism underlying these low antioxidant levels, it is possible that an increase in oxidative stress in HIV is the cause.

This review looked at Vitamin and mineral levels in the IVDU population. 4 of the 6 papers included HIV positive subjects.

Studies have shown that antioxidant supplementation can increase serum antioxidant levels (Tang et al 2000). However what effect does this have on the immunological status of the subject?

A study by Semba et al (1998) looking at Vitamin A supplementation and HIV viral load in IVDU, where a single dose of Vit A 60mg retinol was given to 60 subjects, found that in the placebo group there was a significant decrease in Vitamin A levels ($p=0.01$) compared to no significant decline in the treatment group.

However there was no significant relationship between vitamin A in the treatment group and HIV viral load ($p=0.65$). In addition there was no significant difference between CD4 count at baseline and follow up visits between the two groups.

This result is supported by another study by Zmarzly et al which looked at retinol-vitamin A levels as a prognostic value in HIV subjects who are former IVDU. Results suggested no statistical differences in retinol and retinol binding protein concentration between case and control groups, mean levels of retinol-vitamin A were within normal levels in both groups (HIV positive and negative), there was no significant difference in retinol-vitamin A levels at different CD4 counts. It was noted that retinol-vitamin A levels in HIV positive females was lower compared to HIV positive males ($p=0.03$).

Looking again specifically at vitamins, Islam et al conducted a study looking at levels of Vitamins A, C and E and their link to drug use, sexual practice and socio economic factors in IVDU (HIV status known).

Vitamin E, C and A status of drug addicts was significantly lower than non addicts- $P= 0.05, 0.003$ and 0.048 respectively.

Multiple drug use reduced retinol levels ($p=0.016$) and increased duration of drug use resulted in lower levels of Vit E ($p=0.048$) and retinol ($p=0.041$).

Age, sexual practice, condom use and STDs had no effect whilst income had slight effect but none of significance.

Baum in 2000 carried out a review of studies looking at nutritional deficiencies in IVDU and MSM. Deficiencies were evident in almost 50% of IVDU for Vitamin A and E which were not apparent in MSM group. Evidence of inadequate nutritional status with respect to at least one nutrient was found in 89% of the IVDU group, multiple abnormalities were reported in 41% of the group with low plasma levels of A, C, E and Zn most prominent. Is this vulnerability to nutritional deficiency secondary to drug-nutrient interactions and poor intake? A multivariate analysis for nutritional status and survival in the IVDU cohort showed that there is a significant associated risk of mortality with Se deficiency. Role of selenium in antioxidant defence may slow progression and improve survival in a population where HAART is not available.

In another study by Islam et al looking at the nutritional status of drug addicts undergoing detoxification (no HIV subjects) compared to controls, malnutrition evident in the drug user group was related to drug use and some socio economic factors contributed.

The drug addicts had significantly lower BMI, Hb, total protein and albumin levels ($p<0.001$). Clinical signs of nutrient deficiency were diagnosed in approx 74% of drug addicts with anaemia and protein deficiency in 60% of subjects.

Multiple drug use had a negative effect on BMI ($p=0.03$) as did duration of drug use with the addition of significant reduction in Hb, total protein and albumin values.

Drug users with STDs also had significantly lower Hb, total protein and albumin.

There was a positive correlation between education, income and BMI, Hb and total protein in the drug users. Thus suggesting a number of factors should be considered when treating this patient group.

No firm conclusion can be drawn from this review. It is noted that in a number of the studies there was no information regarding dietary intakes, assessment or multivitamin supplementation use. Some of the studies did not specify whether subjects were smokers which could have impacted on the antioxidant result, in addition not all case groups and controls were always matched.

References:

Tang AM, Smit E, Semba RD, Shah N, Lyles CM, Li D, Vlahov D. Improved antioxidant status among HIV infected injecting drug users on potent antiretroviral therapy. *J Acquir Immune Defic Syndr.* 2000 Apr 1;23(4):321-6.

Semba RD, Lyles CM, Margolick JB, Caiaffa WT, Farzadegan H, Cohn S, Vlahov D. Vitamin A Supplementation and Human Immunodeficiency virus load in injection drug users. *J Inf Dis.* 1998; 177:611-616

Zmarzly A, Simon K, Krause K, Rotter K, Gasiorowski J, Zalewska M and Piasecki E. Retinol – Vitamin A in HIV infected patients who are former intravenous drug users. *Nutr Research* 24 (2004), 427-434

Serum vitamin E, C and A status of the drug addicts undergoing detoxification: influence of drug habit, sexual practice and lifestyle factors. Nazrul Islam SK, Jahangir Hossain K and Ahsan M. *Europ J Clin Nutrition.* 2001: 55, 1022-1027

Baum MK. Role of micronutrients in HIV infected intravenous drug users. *JAIDS* 2000;25:S49-S52

Nazrul Islam S.K. et al. Nutritional status of drug addicts undergoing detoxification: prevalence of malnutrition and influence of illicit drugs and lifestyle. *Br Jr of Nutrition* (2002). 88, 507-513

Use of Complementary & Alternative medicines in IV Drug Users

Only 1 paper included in the review

Reference: Use and Assessment of Complementary & Alternative Therapies by Intravenous Drug Users

Eric Manheimer, M.S., Bradley J. Anderson, PhD., and Michael D. Stein, M.D. *The American Journal of Drug & Alcohol Abuse*, Vol 29, No. 2, pp401-413, 2003

Overall finding

Community based population in N America on methadone program or needle exchange program users.

45% of IVDU reported use of at least 1 Complementary or Alternative (CAM) therapy in the last 6 months.

Categories of CAM

CAM was categorised into 1 of the following 5 domains;

Alternative medical systems (eg homeopathy & acupuncture)
Mind-body interventions (eg meditation & hypnosis)
Biological based therapies (eg high dose vitamins)
Manipulative & body based therapies (eg reflexology & massage)
Energy therapies (eg Qi Gong)

In all, 18 different CAM therapies were assessed;

Relaxation
Religious healing
Aromatherapy
Crystal therapy
Meditation
Hypnosis/imaging
Biofeedback
Homeopathy
Herbal medicines
High dose vitamins
Teas
Folk remedies
Reflexology
Chiropractic
Massage
Acupuncture
Special diet regimens
Macrobiotics

The study specifically named individual therapies as previous studies have shown respondents have a lack of knowledge of the terms “complementary” and “alternative”. They therefore hope to avoid under-reporting

Overall, 45% of IVDU reported use of at least 1 Complementary or Alternative (CAM) therapy in the last 6 months.

Mind-body therapies were the most favoured treatments (34%) with biological based therapies 2nd most commonly used (14%)

Alternative medical were next with 10%

Manipulative therapies were used by 9%

Predictors of CAM use

1) Higher education level

Of those respondents with more than high school education, 58% used CAM. 44% of High school graduates used CAM with only 37% of those who did not graduate using CAM.

Education level was strongly assoc with CAM use esp. manipulative & body based methods.

2) Lower Health Related Quality of Life

This was measured by a summated-rating index using 15 items adapted from the SF-36 (Cronbach's alpha=.89)

3) Having a Regular Doctor or clinic

Education level strongly predicted CAM use in those with a regular Dr or clinic.

4) White race

Assoc with a greater use of any CAM vs no CAM therapies

Young people were not more likely to use CAM but when they did, they were found to be more likely to use multiple CAM

Effectiveness of CAM

The study showed a high level of self-perceived effectiveness of CAM. Among CAM users this level was between helpful & very helpful (4.1 on a scale of 1-5)

Reasons for using CAM

Pain relief 65%

Help stop taking drugs 57%

Help relieve withdrawal symptoms 47%

Increase the effects of opiates 13%

Results regarding high education level being predictive of CAM use agree with other studies findings in the General Population & people living with HIV. Not all studies among people with HIV found this association

Conclusions

The authors report a resurgence of CAM use at the time of the study (1997-1998) and they conclude that it may have particular relevance for marginalized populations such as IDU who have a heavy disease burden & at the same time are underserved by conventional medicine.

This may have been true of HIV care at that time however it is unclear whether these findings are applicable in this era of greater use/availability of HAART in 2008.

Risk Factors for Iron Deficiency and Iron Deficiency Anaemia in HIV +ve and -ve Women

Summary of review

Anaemia is the most common morbidity of HIV infection and is associated with increased progression to AIDS and higher mortality. Although several studies have reported a high incidence of anaemia amongst HIV +ve and +ve drug users few studies have been conducted about the risk factors for drug users.

Two studies were found that looked at the prevalence in HIV=ve and HIV-ve drug users and risk factors.

Prevalence

A Dutch study (1) in the cross-sectional arm of the study of 360 drug users HIV+ve and HIV-ve (218 males 142 females) who inject drugs showed anaemia in 10.3% (8.7% men and 14.8% women) of the study population. It does not report on the % of HIV +ve subject who had anaemia.

They used different levels of mean Hb to assess anaemia which was confusing and difficult to review against other papers..

Different types of anaemia are reported: Microcytic which is caused by a deficiency of iron in the diet or blood loss was the main anaemia found followed by: normocytic

anaemia which is usually caused by inflammation and Macrocytic which can be caused by dietary deficiency of VitB12 and Folic Acid.

An American study (2) of 200 women (134+ve 66-ve) 36.5% had iron deficiency with 15.5% having iron deficiency anaemia
No other description of anaemia except iron deficiency was described.

Risk Factors

In the Dutch study (1) frequency of injecting was significantly associated with anaemia. The measures of plasma ferritin and haemoglobin were used to diagnose anaemia. In the subgroup with HIV infection a BMI \leq 20 was a strong predictor of anaemia., but not in HIV+ve with a BMI >20.

In HIV –ve BMI was not associated with anaemia.

The longitudinal part of the study (175 HIV +ve subjects) was conducted to determine the risk of anaemia and analyse extra risk factors for anaemia related to HIV infection. It showed frequency of injecting as significant and factors related to HIV - low CD4+ (\leq 10/6cells/l) and AIDS diagnosis as significant to the development of anaemia.

In the American study (2) a history of injecting drug use in the last six months in HIV+ve and HIV-ve women was associated with an increased risk of iron deficiency anaemia. HIV +ve women only showed a history of injecting drug use was associated with an increased risk of iron deficiency anaemia.

Dietary Intake

Neither study investigated dietary intake in the study subjects. The authors of paper (2) acknowledged this.

Studies

In the Dutch study (1) several different definitions of anaemia and anaemia risk makes comparison with other studies difficult. It defines the different types of anaemia (as per MCV levels also uses haemoglobin) but treats the population as a whole not in the groups of type of anaemia e.g microcytic. The numbers in the study are small, they include male and females and are mainly Caucasian but % of study population not given.

The Longitudinal arm of the study does not state if there were drop-out, but reports 1 to 9 visits per subject. The process in this part of the study is not well described.

The American study (2) uses plasma ferritin and haemoglobin to diagnose iron deficiency anaemia. The subjects are all women of a black race in which the study (1) reports the mean Hb is almost 1g/dl lower than the white population.

Study (1) used Hb <12g/dl men and <11g/dl women to define anaemia

and

Study (2) used <120g/L

Conclusion

Anaemia is common in the drug using population. It is higher than the local population when compared to local figures for the prevalence of anaemia.

Both studies showed that current injection use is a risk factor for anaemia.

For those with HIV a BMI <20 was a risk factor but not if the BMI>20. Progression to AIDS and a low CD4 count are also risk factors.

Neither study investigated dietary intake. One study (2) recommended further research. Study (1) recommended that Public Health goals in reducing injecting behaviour in IVDU as worthwhile. They concluded it may be worthwhile in supplementing the diet of IVDU who develop anaemia with food supplements such as iron , B12 and folate.

Study (2) made no recommendations except to state that further studies may help to provide insight into the possible direction of this epidemiologic association.

References

1. Marieke J van der Werf et al, *Addiction*, 95: (3) 383-392 'Prevalence, incidence and risk factors of anaemia in HIV-positive and HIV-negative drug users'
2. Barbara Dancheck et al, *Journal Acquired Immune Deficiency Syndrome* : Vol 40, number 2, October 1 2005 198-201