

Health Monitor Instrument 6 Months Post Deployment

Surg Capt (navy) M.J.J. Hoejenbos, MD, MPH
Ministerie of Defensie the Netherlands, Health Care Policy.
PO box 20701, 2500 ES The Hague
THE NETHERLANDS
Telephone: +31-70-3187913, telefax: +31-703188020

E.mail address: mjj.hoejenbos@mindef.nl

ABSTRACT

In order to gain more insight in the prevention of health complaints of military personnel after deployment, the Dutch Ministry of Defense has appointed the Prevention and Health Department of the Netherlands Organization for Applied Scientific Research (TNO) to develop a new Health Monitoring Instrument (HMI). The aim was to draft a compact questionnaire, which should provide an indication of the general health condition of the individual soldier. By using the HMI exactly 6 months after the end of the deployment and by editing some questions explicitly about the deployment, it should be possible to use the questionnaire for monitoring both the general health condition and possible problems related to the deployment. Individual health profiles and derived group tables can be generated automatically by using the SPSS program. It is possible to draw up general health profiles with accessory risk profile. In case individual soldier scores a 4 or higher, it is advisable to investigate if special care, or intensifying present care, is desirable. With this health surveillance instrument it is not only possible to monitor the individual health status, but also the health status of groups.

1.0 INTRODUCTION

In order to gain more insight in the prevention of health complaints of military personnel after deployment, the Dutch Ministry of Defense has appointed the Prevention and Health Department of the Netherlands Organization for Applied Scientific Research (TNO) to develop a new Health Monitoring Instrument (HMI). This instrument should preferably be used together with the already existing psychosocial questionnaire.

The urge to do more on health monitoring was originated on the several complains after the UN missions in Cambodia, Uganda en Bosnia in the nineties of last century. The minister of Defense installed several commissions (Mrs. Thiesinga was chairman in several of this commissions) to advise about improvements in the post deployment care. Since then a better structure for care for veterans was organized in the Netherlands, for instance a separated Institute for Veterans. One of the advises was also to make a HMI.

2.0 MEANING

There were 3 meanings formulated for the project. The first was to make a monitoring instrument in the form of a small questionnaire of no more than 10 pages. The maximum of pages was necessary because the questionnaire should be combined with the existing psychosocial questionnaire and a too much paperwork could result in a too big non response.

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The instrument was meant to be used for the total health situation of every military post deployment.

The second meaning was to develop an individual scoring system on which base for every single military a short health profile can be made. If a too high health risk profile is scored, the person can be invited for a further consult to determine if more or specific health care is necessary and or wanted.

The third meaning was to make a standard rapport in which on group level the health situation is described. This rapport can be used to compare different deployments or other parameters.

3.0 THE WAY OF WORKING

To make a new questionnaire an inventory was made of information on health of military and the way that screenings instruments were used to get that information. A selection was made to get only those questionnaires, which could or should predict health problems in the post deployment situation caused by the deployment. The literature researched was validated with the opinion of the defense public health experts.

Literature was also found in the special health problem investigations that followed specific deployments (Cambodia and UNPROFOR), and done by university institutes or TNO. The post deployment medical en social rapport's of the Royal Netherlands Navy and Royal Netherlands Army were used and the advises and suggestions that were given in the past to develop a generic health monitor instrument..

It appeared to be necessary to get more information on screening and on detection of health care problems. So, a Medline-search focused on health of military, Gulf War Syndrome, Chronic Fatigue Syndrome and generic instruments to monitor the health situation of groups of employees. On base of this information it was decided which indicators were the most appropriate to monitor the health situation of military. Baseline for the development of the HMI-instrument was to use as much as possible standard scales and questionnaires, that are used in the civil community or in the military.

This makes it better possible to use the results of the questionnaires and compare them to the standards. The following surveys and questionnaires are (for instance) used for selection:

- The Veteran survey that was done by order of the Ministry of Defense (Bramsen et al, 1997),
- The post-deployment survey of the psychological department of the army (AIH)(Flach & Zijlmans, 1998),
- The Cambodia complain study (De Vries et al, 1998; 2000)
- The periodic health surveys that are used by the occupational health department of the army.

Because of the specific target of the HMI-instrument questions are added to gain insight in the different health risks during deployment, that can have influence on the health perception of a military. The different civilian health questionnaires and the selected instruments, with their possibilities and problems are discussed in the original rapport (TNO, 2003).

4.0 THE HMI-QUESTIONNAIRE

The Netherlands Defense organization wanted to have an instrument, which could give as well individual information as information on group level. On both levels there should be insight in:

- Prevalence of health problems post deployment
- Changing in (number and sort) health problems post deployment;
- (experienced) exposure to risk factors (not only focused on stress or psychological factors, but all factors that can potential influence health);
- the (social medical) health care needs, that are related to this.

The instrument had to be as compact as possible, to make it easier to combine the existing psychosocial questionnaire and keep the non-response as low as possible. The combination should not exceed 10 pages. In the psychosocial questionnaire several items are asked, which are also necessary for the interpretation of the health situation. That is the case not only for name, addresses, demographic and background variables, but also the PTSD-list and exposing experiences. Those items are also part of the HMI results.

All those considerations were part of the discussion and at the end a selection was made in 10 clusters for the HMI:

- General health situation (inclusive functional disorders).
- Experienced health and experienced relation to deployment
- Diseases and long-lasting health problems
- Acute health problems and infectious diseases
- Non-specific complains/post deployment complains
- Fatigue
- Sleeping problems
- PTSD
- Functional disorders
- Extra load (burden) factors

These ten clusters are related to health and possible exposure of risks. Above that some questions concern the use of healthcare and the need for healthcare.

In the original rapport the considerations are explained around the decision to involve certain questions or not. In every cluster there was a decision about the most appropriate questionnaire. If this was a general (civilian) questionnaire there was a discussion if this instrument was also applicable in the military setting. If necessary there were made some adjustments to make it better usable in the military setting, but without changing the original formulation so much, that the results are not anymore to compare with the standards.

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4.1. The individual health profile

In table 1 is written which scores are used as normal in the different clusters. The following starting points per cluster are used for the score:

- First the scores are used on base of references in articles. As much as possible the official and standard scores in the literature is used, if possible based on a military population.
- Above that per cluster a second score is made based on remarks with respect on content (unless there was no real reason to detect).
- If the score exceeds the lowest point this is called “a risk factor”. If the highest point is exceed there is “a signal”.
- If there is no reasonable theoretical base for the threshold for “risk factor” or “signal” (for instance: there is no or not yet information about references) the threshold is decided on by the experts committee using the references in the pilot.
- If there was no usable external norm for a separate indicator it was decided, that in the pilot no more than 20% should exceed the threshold point. It was kept in mind, that the pilot population had a quiet “normal“ deployment without special risks or expected health problems.
- Even if the scores for the threshold points were scientifically based, the criteria are adjusted on base of the results in the pilot. This is applicable for the individual clusters of questions and scales but als the combinations.

For the amount of exceeding of the thresholds (“risk” and “signal”) a score can be counted per person. In the expert group a decision is made on the preferable action, that should follow than. Till now the opinion is, that in such a case the professional (doctor or psychologist) will make contact by telephone. In the conversation both can agree upon the need for further contact with a special medical doctor or psychologist. Before this call is made there is tuning between medical and psychological expertise.

The results of those calls can be used in the evaluation of the HMI and decisions about adjustment of the thresholds.

To calculate the individual score the following principles were used:

- Score = 1 if the “risk threshold is passed, but not the “signal” point.
- Score = 2 if the “signal” point is passed.
- Per cluster gets because of that the score 0 (no exceeding of any threshold), 1 (passing risk-border) or 2 (passing signal border).
- All the clusters are counted together and that is the total score.

If the total is higher than 4 the military are qualified for follow-up. This is the case if:

- Minimum of 2 signals; or
- Minimum 1 signal in combination with a minimum of 2 risk factors or,
- Minimum 4 risk factors without any signal.

On base of the references it can be concluded, that cumulating of health problems is a better predictor for post deployment complains that the existence of a specific health problem. In the present way of counting it is assumed, that problems only need more active care, if more clusters are involved. If a lower threshold is used the group of “high health risks” will be to big, and the possibility of coincidence (for instance because a temporary problem like the flu) will be too great.

4.2. Relation between HMI and Psychosocial questionnaire

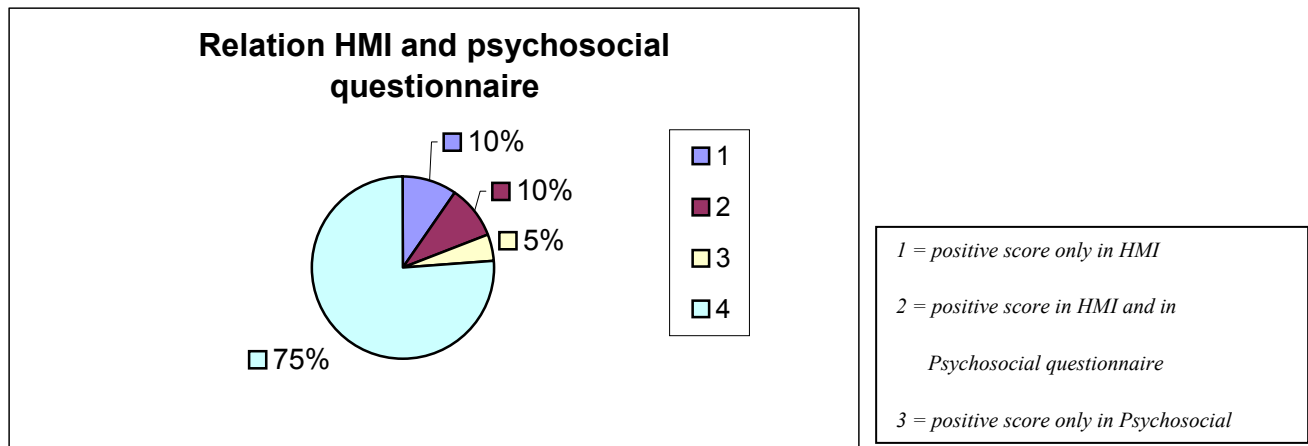
In the graphic (illustration 1) is shown what the relation is between the original psychosocial questionnaire and the new HMI. The relation between both post-deployment healthcare indicators is substantial and significant ($p < .001$). This is also caused because some psychosocial indicators were used in the HMI. Also in general, it is known, that there is always found a substantial correlation between psychological and other health indicators in surveys like this (Wessely, 2001; De Vries, 2001; Mulder & Reijneveld, 1999).

In the graphic it can be seen, that of the 50 persons who have a positive indicator for further suggestion for the post-deployment healthcare on base of the HMI-algorithm exact the half (25 persons) will also be positive on base of the interpretation of the psychosocial questionnaire.

The agreement on the group for which no further post deployment healthcare is necessary is much larger. On base of the HMI-protocol 209 of the 259 persons (80,7%) have so low amount of health problems reported, that they don’t need further contact. In almost 95% of the cases, the psychological opinion is the same: no further healthcare proposal is needed for them. In 5% of the cases (12 persons) the psychologist, decided on base of the different answers on the list, that a telephonic contact was needed.

When the 2 adjustments are compared, the conclusion can be made, that the introduction of the HMI in the Defense post deployment period will lead to more military, for whom there is an (possible) indication for post deployment (health) care. To conclude if that is really the case other investigations are necessary.

ILLUSTRATION 1



5.0 THE GROUP MONITORING

The rapport about the results on group level is made in the format of a compact monitoring rapport. The information (graphics and tables) are generated right away from the statistic software, that is used for the data-analyses (SPSS 11.0). That is the reason that in short time it is possible to produce a basis monitoring rapport. This is done to give quick insight in the most important health relevant characteristics of the deployed population. On this way it is possible to decide if (and if so: on which specific part) further investigation or healthcare is necessary. In every page, a health cluster is discussed. First, there is a short introduction in the items in the cluster. Then a table is shown in which the prevalence of health problems in that cluster is given. This is combined with the percentage of the deployed population in which the criteria are exceeded. To get insight in the differences between subgroups 4 relevant background variables are divided: age (in 3 groups), rank (soldier, NCO, officer), type of contract (fixed short versus lifetime employment) and the if the contemporary deployment was the first deployment of those military. These differences between the subgroups are validated on significance.

A problem for interpretation of further differences is the small amount of people in the subgroups. No validated conclusions can than be thrown.

Reporting of other items like adjustment problems and adaptation problems and opinion on preparation and post deployment care and items related on the home front are no subject of the group monitoring rapport if the HMI, but are the responsibility of the department, that deliver the psychosocial questionnaires.

6.0 PILOT

In the summer of 2002 there was a pilot of the combined questionnaire (the regular psychosocial questionnaire and the new HMI). This was a group of 855 military who were deployed in a peacekeeping mission SFOR (roulation 10) in 2001 to Bosnia. This group military consisted mostly of Army (90%) together with some of the Royal Military Police (10%). They got the questionnaire a half year after they had returned.

Because the pilot was taken in a rather difficult period (summertime) the group that didn't react got a new second chance. Both questionnaires were put in the computer at the psychological department of the Army. Both parts of the questionnaire got a unique identifier, via which combination of the two parts was possible. The anonymised HMI-information, together with some special psychosocial items (which were important to make a interpretation for the HMI) were given to TNO-PG. TNO made the analyze and rapport of the information. In the future, this work can be dome in the Defense organization without TNO.

7.0 CONCLUSIONS

From the pilot the conclusion can be made, that the HMI in general has met the demands. Because the obliged maximum of pages (6 pages) there were some concessions in the possibility to ask more questions on certain health aspects. Some questions seemed to give only a little extra information. If questions add only a prevalence of less than a few percent it can be decided to skip those questions if a more compact questionnaire is necessary, unless the question is integral part of a validated questionnaire. The contemporary HMI-list has to be seen as a prototype. Not only will changing the psychosocial list change the HMI but also should special risks during deployment have influence on the actual questionnaire. Moreover, not in the least: the results of scientific work and experiences with the list should develop the instrument.

Also a further integration of psychosocial questions and health questions is necessary to minimalism the overlap, as it is necessary to harmonize the work of the psychosocial and (social) medical departments.

It can already be advised, that 2 questions should be added, which are concentrated on the concept of 'Un-Met Needs'. This is the need for help or care, although this help or care is not in fact asked by the person. The questions about this are formulated in the Nemesis Survey (Bijl en Ravelli, 1998).

Evaluation of the made normscore of 4 points is necessary. It seems to give a good criteria for the decision to suggest more "care" to the military. This can better be validated if a randomized trial is made of selected people who got more care and (if possible) a selection of persons who didn't get a suggestions of more care.

If The HMI questionnaire is used on an other moment than 6 months post deployment, the profiles (scores) and questions have to be adjusted. On this moment in some questions the period of the validated questions happens to be synchronized with the 6 month deployment and the 6 month post deployment period for instance long-lasting health problems, use of healthcare system, un-met-needs)

It is necessary to try to optimize the response. In the pilot the response was only 35%. The low, and sometimes selected response has consequences for the conclusions that can be made about the health situation of the total group. The conclusions (and the suggestion to give for more health care) for the individual respondent is in fact to trust. But still it has to be taken in account, that a substantial part of the deployed group, especially those with a higher risk for health problems (low rank, low educated and young military with a short time contract) do not in the same ratio take part in this health care monitor.

May be the wish to give optimal individual healthcare (for which the personal identity is necessary) conflicts with the wish to get an objective insight in the mental and physical health of the deployed military. Possible a "non response evaluation" can give more information about the background. Also can be thought about the possibility to give feed-back about the (eventually anonymized) results and advises of the questionnaire.

From the perspective of individual healthcare seems the relative low response not a very great problem, because everyone who wants the join, can join. However, the problem to keep in mind is, that the non-response group exists especially from people with a higher amount of complains.

The data from the questionnaires of different deployments should be put in a databank to get a military reference. Than it will be possible to compare different deployments and different (sub-) groups. Then it will be possible to detect patrons an signals in health complains in time.

The questionnaire and the results of the pilot are available (in Dutch) via the authors.

8.0 REFERENCES

- Aaronson NK, Muller M, Cohen PD, Essink-Bot ML, Fekkes M, Sanderman R, Sprangers MA, Velde A te, Verrips E. Translation, validation and norming of the Dutch language version of the SF-36 Health survey in community and chronic disease populations. *J Clin Epidemiol* 1998; 51:1055-68
- Alberts M, Smets EMA, Vercoulen JHMM, Garssen B, Bleijenberg G. Korte Vermoedheidsvragenlijst: een praktisch hulpmiddel bij het scoren van vermoeidheid. *Ned Tijdschr Geneesk* 1997;141:1527-30.
- Baal, M van. Trendcijfers Gezondheidsenquête: Aspecten van ongezond gedrag, 1989-1996
- Bijl, RV & Ravelli, A. Psychiatrische Morbiditeit, zorggebruik en zorgbehoefte. Resultaten van de Netherlands Mental Health Survey en Incidence Study (NEMESIS). *Tijdschrift voor Gezondheidswetenschappen*, 76, 446-457, 1998.
- Blatter BM, Roeleveld N, Zielhuis GA, Verbeek AL. Assessment of occupational exposure in a population based case-control study: comparing postal questionnaires with personal interviews. *Occup Environ Med* 1997;54:54-9.
- Bouter LM, Dongen MCJM van. Epidemiologisch onderzoek: opzet en interpretatie. Houten (etc.) Bohn Stafleu Van Loghum, 1995.
- Bramsen I, Dirkzwager JE, Ploeg HM van. Deelname aan vredesmissies: gevolgen, opvang en nazorg. Amsterdam: Vrije Universiteit Amsterdam, EMGO Instituut, 1997.
- Burgers JS, Dijn NP van. Sinusitis en bovenste luchtweginfectie: een zinvol onderscheid? *Huisarts en Wetenschap* 1997;40:633-5.
- CBS. Statistisch Jaarboek 2001. Voorburg/Heerlen: CBS, 2001.
- CBS. Vademecum gezondheidsstatistiek 2001. Voorburg/Heerlen: CBS, 2001.
- Croft AMJ, Creamer IS. Health data from Operation Resolute (Bosnia). Part 1: Primary Care Data. *J R Army Corps* 1997;143:13-8.
- DHV. Risicobeschouwing. Blootstelling van Nederlandse militairen aan milieuverontreinigingen op de locatie 'Boris Kidric', Lukavac. DHV Milieu en Infrastructuur, 1999.
- Drijver M. Ziekteclusters in relatie tot milieuverontreiniging: een handleiding voor gezondheidsdiensten. Leiden: NIPG-TNO, 1989. Scriptie Medische Milieukunde.
- Esch SCM, Bramsen I, Sonnenberg GP, Merlijn VPBM, Ploeg HM van der. Het Post-Cambodja Klachten Onderzoek. Het welbevinden van Cambodja-gangers en hun behoefte aan hulp en nazorg. Amsterdam: Vrije Universiteit, EMGO, 1998.
- Fiedler N, Kipen H, Natelson B, Ottenweller J. Chemical sensitivities and the Gulf War: Department of Veterans Affairs Research Center in basic and clinical science studies of environmental hazards. *Regul Toxicol Pharmacol* 1996;24:S129-38.

- Flach A, Zijlmans A. Vragenlijst Nazorg-Koninklijke Landmacht: verwerkings-problemen na uitzending. Koninklijke Landmacht, Afdeling AIH, (Amersfoort) & Afdeling Gedragwetenschappen (Den Haag), 1998.
- Fleisher JM, Kay D, Wyer M, Morano R. Perception bias in cohort studies of environmental exposures: a major methodological problem. Abstract presented at the annual conference of ISEE & ISEA. Epidemiology 1998;9(4) supplement.
- Friedman MJ. Neurobiological sensitization models of post-traumatic stress disorder: their possible relevance to sensitivity syndrome. Toxicol Ind Health 1994;10:449-62.
- Fritschi L, Siemiatycki J, Richardson L. Self-assessed versus Expert-assessed Occupational Exposures. Am.J.Epidemiol 1996;144:521-7.
- Haley RW, Kurt TL, Hom J. Is there a Gulf War Syndrome? Searching for syndromes by factor analysis of symptoms. JAMA 1997;277:215-30.
- Haley RW. Is Gulf War Syndrome due to stress/ The evidence reexamined. Am J Epidemiol 1997;146:695-703.
- Haley RW. Bias from the 'Healthy-Warrior Effect and unequal follow-up in three government studies of health effects of the Gulf War. Am J Epidemiol 1998;148:315-23.
- Hovens JE. Research into the psychodiagnostics of posttraumatic stress disorder. Delft: Eburon Press, 1994.
- Jelicic M. Geheugenstoornissen na blootstelling aan chronische stress: een kritisch overzicht. Psycholoog 1997;32:446-9.
- Jones RR. Air Pollution related to transport: diesel is the main problem. BMJ 1996;312 (7046); 1605-1606.
- Kamp I van, Velden PG van der (2001). Vuurwerkramp Enschede: Lichamelijke en geestelijke gezondheid en ervaringen met de ramp; rapportage van het gezondheidsonderzoek. Rapport 630930002 / 99 20012. Bilthoven / Zaltbommel /Almelo: RIVM, IVP, GGD Twente.
- Kemeny M, Peakman M. Recent advances in immunology: clinical review. BMJ 1998;316:600-3.
- Kipen H, Hallman W, Diefenbach M, et al. Self-reported health status and exposure among Gulf War registry veterans. Abstract presented at the annual conference of ISEE & ISEA. Epidemiology 1998;9, 4, supplement.
- LaDou J. Occupational and Environmental Medicine. Prentice-Hall International, 1997.
- Kipen HM, Hallman W, Kelyy-Mcneal K, Fiedler N. Measuring Chemical Sensitivity Prevalence: A Questionnaire for Population Studies. Am J Public Health 1995;85:574-7.
- Loos WS de. Chronic fatigue Syndrome: fatigue of unknown origin. Eur J Clin Invest 1997;27: 268-9.
- McDowell I, Newell C. Measuring health: a guide to rating scales and questionnaires. New York: Oxford University Press, 1987.
- McKinney WP, McIntire DD, Carmody TJ, Joseph A. Comparing the smoking behaviour of veterans and non-veterans. Public Health Rep 1997;112:212-21.

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Mulder YM, Reijneveld, SA, Dommelen P. van. Health Monitoring Instrument: ontwikkeling van een screeningsinstrument voor gezondheidsmonitoring bij militairen. TNO Preventie en Gezondheid, 2003.

Mulder YM, Reijneveld SA. Gezondheidsonderzoek UNPROFOR, TNO Preventie en Gezondheid, 1999.

Redlich CA. Environmental health: more controversy, little clarification. Lancet 1998;352(suppl. IV)9.

Reijneveld SA. Door de vliegtuigramp in de Bijlmermeer toename van gerapporteerde hinder van vliegtuiglawaai maar niet van gemeten psychiatrische klachten. Ned Tijdschr Geneesk 1994;138: 1523-8.

Rothman KJ, Greenland S, ed. Modern Epidemiology. Lippincott-Raven Publishers, 1998.

Rowat SC. Integrated defense system overlaps as a disease model: with examples for multiple chemical sensitivity. Environ Health Perspect 1998;106(suppl. I):85-109.

Soetekouw PM, de Vries M, van Bergen L, Galama JM, Keyser A, Bleijenberg G, van der Meer JW. Somatic hypotheses of war syndromes. Eur J Clin Invest 2000, 630-41.

Sonsbeek JLA. Vertel me wat er aan scheelt: betekenis en methodische aspecten van enquetevragen naar de gezondheid. Proefschrift. Heerlen: CNS, 1996.

Steenland K, Savitz DA, eds. Topics in Environmental Epidemiology. New York: Oxford University Press, 1997.

Swanink CMA. Chronic Fatigue Syndrome: clinical, microbial and immunological aspects. Proefschrift Landbouwwuniversiteit Wageningen 1996.

Taris TW. Nonrespons en representativiteit in panel studies. Kwantitatieve Methoden, 1995;16(48): 41-44.

Vandenbroucke JP, Hofman A. Grondslagen der Epidemiologie. Utrecht, Wetenschappelijke Uitgeverij Bunge, 1988.

Velden, P.G. van der, Rietvink, L., Dusseldorp, A., Fournier, M., Stellato, R.K, Drogendijk, A.N., Dorresteyn A.M., Christiaanse, B. (2002). Gezondheid Getroffenen Vuurwerkcramp Enschede: rapportage gezondheidsonderzoek 18 maanden na de ramp. Rapportnr. 99 2002 3 / 63093004. Zaltbommel / Bilthoven: IvP, RIVM.

Versluis RGJA, Waal MWM de, Opmeer C, Petri H, Spinger MP. Prevalentie van chronische- vermoeidheidsyndroom in 4 huisartspraktijken in de regio Leiden. Ned Tijdschr Geneesk 1997;141: 1523-26.

Vries M de, Soetekouw PMMB, Bleijenberg G, Meer JWM van der. Het Post-Cambodja Klachten Onderzoek Fase 1: een inventariserend onderzoek naar aard, omvang en ontstaanswijze. Nijmegen: St.Radboud, 1998.

Vries M de, Soetekouw PM, van der Meer JW, Bleijenberg G. The role of post-traumatic stress disorder symptoms in fatigued Cambodia veterans. Mil Med 2002, 790-4.

Vries M de, Soetekouw PM, Van Der Meer JW, Folgering H, Bleijenberg G. Physical activity and exercise performance in symptomatic Cambodia veterans. QJM 2002, 99-105.

Vries M de, Soetekouw PM, Van Der Meer JW, Bleijenberg G. Natural course of symptoms in Cambodia veterans: a follow-up study. *Psychol Med* 2001, 331-8.

Soetekouw PM, de Vries M, van Bergen L, Galama JM, Keyser A, Bleijenberg G, van der Meer JW. Somatic hypotheses of war syndromes. *Eur J Clin Invest* 2000, 630-41.

Vries M de, Soetekouw PM, Van Der Meer JW, Bleijenberg G. Fatigue in Cambodia veterans. *QJM* 2000, 283-9.

Ware J.E., Kosinski M., Keller S.D. SF-12: How to score the SF-12 Physical and Mental Health Summary Scales. Boston, MA: The Health Institute, New England Medical Center, Second Edition, 1995.

Wegman DH, Woods NF, Bailar JC. Invited Commentary: how would we know a Gulf War syndrome if we saw one? *Am J Epidemiol* 1997;146:704-11.

White E. Hunt JR, Casso D. Exposure measurement in cohort studies: the challenges of prospective data collection. *Epidemiol Rev* 1998, 20: 43-56.

Wolfe J, Proctor, SP, Friedman MJ. Re: Is Gulf War Syndrome due to stress? The evidence reexamined. *Am J Epidemiol* 1998;148:402.

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TABLE 1

Cluster	criteria	Eventual extra condition(s)
Cluster 1A: Physical health general (SF-12)		
Criteria risk factor	PCS < 50	
Criteria signal	Non	
Cluster 1B: Mental health general (SF-12)		
Criteria risk factor	MCS < 50	
Criteria signal	Non	
Cluster 2: Experienced health		
Criteria risk factor	Experienced health rather bad or bad OR score now < 6: OR diminishment of score between 'pre deployment' and 'during or after deployment' ≥ 1.5 : Or diminishment score between 'pre deployment' and 'contemporary score' ≥ 1.5	Only if the diminishment of > 1.5 point is possible caused by the deployment.
Criteria signal	Experienced health rather bad or bad	
Cluster 3: Long-lasting health problems		
Criteria risk factor	Minimum of 1 long-lasting or heavy complain in last year, which:	Still is there and If no medical doctor is consulted for that in the last year.
Criteria signal	Minimum of 1 long-lasting or heavy complain in last year, which:	Still is there and If no medical doctor is consulted for that in the last year. Was not there in the year before deployment.
Cluster 4: Infectious diseases		
Criteria risk factor	Often (3 times a year or more) of 1 of the 4 health problems and also:	If no medical doctor is consulted for that; If the problem is post deployment more often than before.
Criteria signal	Non	
Cluster 5: Non- specific illness complains		
Criteria risk factor	If since the departure to the past deployment there were a minimum of 3 complains (disregard the situation before)	
Criteria signal	If since the departure to the past deployment there were often a minimum of 3 complains (disregard the situation before), if:	Minimum of 2 complains of these we not regular existing before deployment; Or if the problem was more often there in the last year than in the year before deployment. (in the case of infectious diseases).
Cluster 6: Fatigue		
Criteria risk factor	Score ≥ 32 on 8 items from the CIS-Fatigue	
Criteria signal	Score ≥ 37 on 8 items from the CIS-Fatigue	
Cluster 7: SCL-90 Sleeping problems		
Criteria risk factor	Norm score of SCL-90 (3 items ≥ 6 (m) or 7 (f)	If there was also a regular sleeping problem during or post deployment.

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Criteria signal	Non	
Cluster 8: PTSD		
Criteria risk factor	Definition of partial PTSD: Score \geq 1 on re-experiencing or Score \geq 3 on Avoidance or Score \geq 2 on Hyper arousal.	
Criteria signal	Definition of full blown PTSD: Score \geq 1 on re-experiencing and Score \geq 3 on Avoidance and Score \geq 2 on Hyper arousal.	
Cluster 9: Functional disorders		
Criteria risk factor	Post deployment functional disorders (regardless of sort or how bad) in regular work	
Criteria signal	Post deployment functional disorders (regardless of sort or how bad) in not to heavy work	
Cluster 10A: Experienced physical burden and bother during employment		
Criteria risk factor	During deployment inconvenience caused by 3 or more named factors (physical strain, climate, exposure to chemicals).	If minimum of 1 of these had influence on the health.
Criteria signal	During deployment regularly inconvenience caused by 3 or more named factors (physical strain, climate, exposure to chemicals).	If minimum of 1 of these has (according to the person) still influence on the health.
Cluster 10B: experienced mental stress during deployment		
Criteria risk factor	If the deployment was experienced as “rather or very” thrilling, threatening, or powerless	If this was the case in minimum 1 of 3 questions.
Criteria signal	Non	
Cluster 10C: experienced mental stress, Life Events		
Criteria risk factor	More than 1 rather touching to very touching situation in the period around the deployment.	Without life event related to own health.
Criteria signal	Non	

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