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Department of Pharmacy

# Knowledge, attitudes, and practice behaviors of Norwegian pharmacy workers toward the use of herbal products and dietary supplements by dementia patients

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*Master thesis in Pharmacy, May, 2015*





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## Summary

### Background

The results of several research studies indicate that herbal products (HPs) and dietary supplements (DS) are used by high percentage of demented patients up to about 50% (Dhikav et al., 2012; Thorpe et al., 2012; and Risvoll et al., 2014). Due to the cognitive symptoms in dementia, patient safety may even be of greater concerns in dementia patients compared to other patient groups. The aim of the study is to investigate the knowledge, attitudes and practical behaviour of pharmacy workers in Nordland County of Norway concerning the use of HPs and DS by dementia patients.

### Materials and methods

A total of 105 pharmacy workers in Nordland County of Norway participated through Questback (54%) to answer 35 questions. A pilot survey was carried out by distributing the questionnaire to 15 pharmacists and pharmacy technicians in Tromsø in order to enhance question clarity and check the readability and understanding of questions, as well as the length of the questionnaire.

### Results

Hundred and five pharmacy workers responded to the electronic questionnaire. The response rate was 54%. The result of the survey shows that 98% of the pharmacy workers have received questions about the HPs and DS. The pharmacy workers used different sources to get knowledge and information about DS, of which Internet (27%) and information from manufacturer (17%) were among the most frequently used ones. Ninety one percent of pharmacy workers ask dementia patients about the use of conventional medicines when they sell HPs and DS at least sometimes, while only 25 % of them always ask such question. Only six percent were trained to communicate with patients with dementia.

The results of the survey indicate that 17% of pharmacy workers check the possible drug-HPs and DS interactions as a routine. But, 91% percent supply information on drug-HPs and DS interaction and side effects of HPs and DS at least sometimes. Thirty six percent of pharmacy workers recommended the use of HPs and DS to patients without customers asking for it, and documented effect of HPs and DS is the top reason given for the recommending.. Among the 66 pharmacy workers not giving recommendation to use of DS and HPs, the most frequently reported reasons were the lack of necessary knowledge and risk of drug interaction.

The result also showed that 60% of pharmacy workers agreed on the statement that, use of DS may involve a risk of reduced health and are aware of risks regarding the use of these products. And 28% were uncertain about it. General practitioners got the highest responsibility ranking (Mean priority=2) and were seen as the main safe guardians for dementia patients. The pharmacy workers ranked themselves behind the other health workers.

### Conclusions

Many of the pharmacy workers who participated in this study do not receive enough education with respect to dementia patients. The knowledge of pharmacy workers about HPs and DS as a whole needs to be improved in order to increase the patient safety. There is a lack of product independent information and also availability of information about HPs and DS in most of the pharmacies in Nordland county of Norway. Pharmacy workers in Nordland County do not routinely document or monitor dementia patients' use of DS and HPs. Furthermore, most of the pharmacy workers believe that general practitioners have a very important role as safety provider for dementia patients and see themselves less responsible.

## Abbreviations

NAFKAM – The national research center in Complementary and Alternative Medicine

SPSS- Statistical Package for the Social Science

DS – Dietary Supplements

HPs- Herbal Products

WHO - World Health Organisation

NOMA– Norwegian Medicines Agency (Statens legemiddel verket, SLV)

FDA- The US Food and Drug Administration

UiT-The Arctic University of Norway

IFA- Institute Of Pharmacy ( Institutt for farmasi)

RELIS- Regional medicines information centres in Norway (Regionale legemiddelinformasjonsentre)

NOPA- Norwegian pharmacy association ( Apotekforening)

NOEHL- The Norwegian Electronic Health Library (Helsebiblioteket)





## Definitions

**Medicines** are “substances, drugs and preparations that are intended or presented for use to prevent, cure ,or relieve disease, disease symptoms or pain, or to affect physiological functions in human beings or animals, or by internal or external use to influence disease”

“ *Stoffer, droger og preparater som er bestemt til eller utgis for å brukes til å forebygge, lege eller lindre sykdommer, sykdomssymptomer eller smerter, påvirke fysiologiske funksjoner hos mennesker eller dyr, eller til ved innvortes eller utvortes bruk å påvirke sykdom*” ( Hva er et legemiddel? Norwegian Medicine Agency, accessed 2015).

**Dietary supplements** are nutrients, which are intended to supply the diet. The products should contain concentrated sources of vitamins and minerals or other substances with a nutritional or physiological effect. DS are under the responsibility of The Norwegian Food Safety Authority (Om kosttilskudd og legemidler 29.09.2014).

**Herbal products** are defined as “*herbal preparations produced by subjecting herbal materials to extraction, fractionation, purification, concentration, or other physical or biological process. They may be produced for immediate consumption or as the basis for herbal products. Herbal products may contain excipients, or inner ingredients, in addition to the active ingredients. They are generally produced in larger quantities for the purpose of retail sale*” (World Helath Organization, 2001).



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# 1 Introduction

*A brief introduction is given in this chapter in order to covers the underlying background and problem area of the research project. This chapter also presents the aim and objective of the thesis.*

## 1.1 Dementia

Dementia is a syndrome characterized by impairment of memory and other cognitive functions sufficient to interfere with normal life (Gottfries et al., 1998). The syndrome is to date still a devastating medical condition with only symptomatic drug treatment available. With the increasing age of the general population, dementia is a substantially growing health problem with high socioeconomic relevance. The numbers of people with dementia are increasing (see Figure 1.1). It was estimated that the number of sufferers from dementia would increase from 35 million in 2010 to 65 million in 2030, and 115 million in 2050, on a global basis (Wimo and Prince, 2010). World Health Organization (WHO) reports that every year, there are 7.7 million new cases (WHO, 2015). This is directly correlated with the increasing cost of the health care system (Jöhnson and Wimo, 2009; and Wimo et al., 2013). In Norway, about 70.000 people have dementia, which means that about 250.000 people, including the patients and their families, are affected by the disease (Helse-og omsorgdepartementet, 2005-2006).

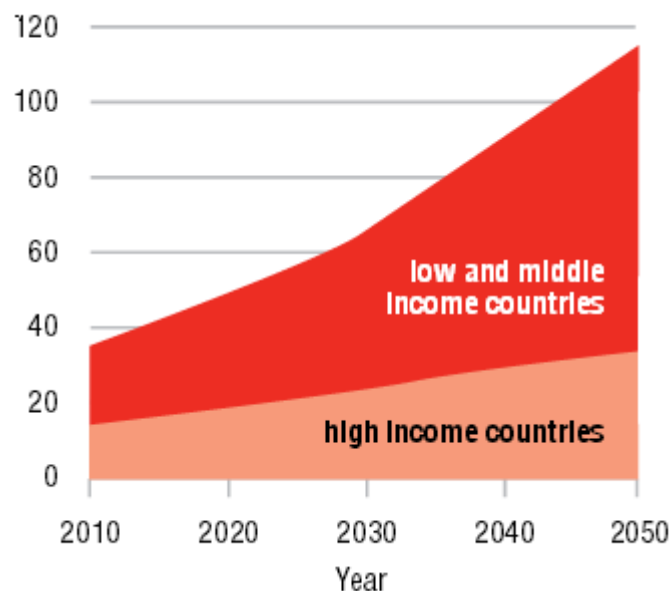


Figure 1.1. The growth in numbers of people with dementia in low and middle-income countries, millions (Wimo and Prince, 2010)

## 1.2 Use of herbal products and dietary supplements

There has been a considerable increase in consumption and marketing of herbal products (HPs) and dietary supplements (DS) in the last two decades in many parts of the world (Waaseth et al., 2007; Messina, 2006; Alkharfy, 2010; Duraz et al., 2011; and Fahmy et al., 2010). In recent years, the use of HPs and DS has increased dramatically in the Western countries and has maintained its popularity in many African and Asian cultures (Eisenberg et al., 1998; Health Canada and Ipsos Reid, 2005; and World Health Organization, 2008). The use of HPs and DS supplements is also increasing in the Norwegian society (Christel, 2010). A study in Norway in 2012 which included 1002 persons, showed that Norwegians spent almost €375 million on DS, and €75 million on HPs and natural remedies, or a total of about €400 million in 2012. 70% reported use of DS in the past year, and 12% reported the use of HPs and natural remedies (NAFKAM, 2013). The total sales of HPs and DS in Norway from 1998 to 2011 is shown in Figure 1.2.

Another study showed a prevalence of dietary supplements use of 71.8% in Norwegian middle-aged women (Tytlandsvik, 2014).

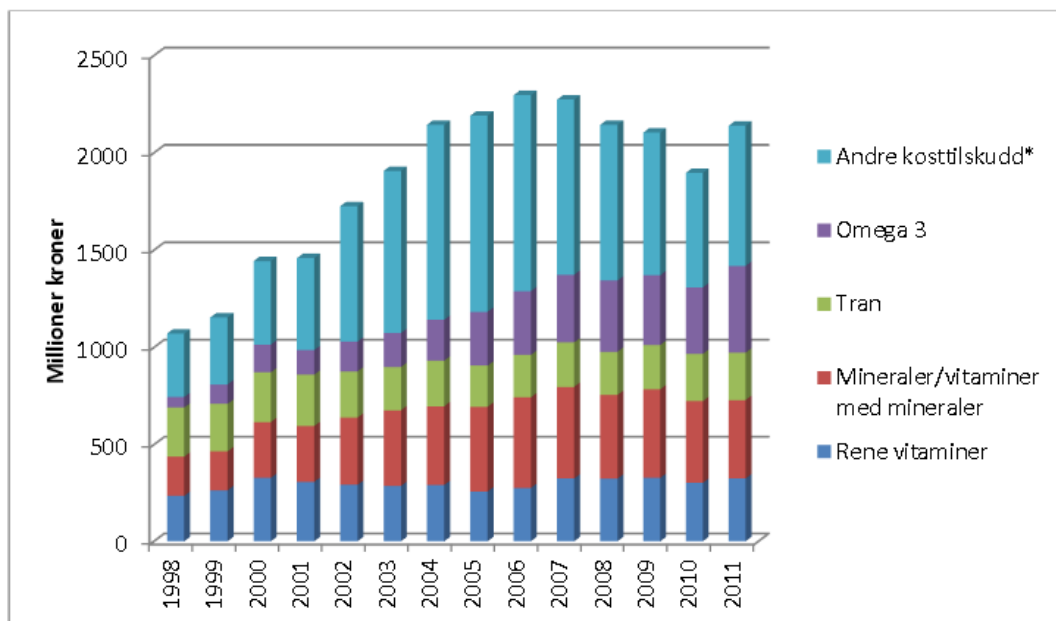


Figure 1.2 Total sales of HPs and DS in Norway from 1998 to 2011(The Norwegian Food Safety Authority , 2013)

The increasing use of HPs and DS is probably associated with frustrations with or lack of available conventional drug treatment, chronic health issues, cultural factors, traditional usage, easy availability, low cost and the general belief of usefulness of HPs and DS and their fewer

side effects etc. (Verhoef et al. 2005; Nada et al., 2007; and Tang et al., 2013). The results of two Norwegian master theses also showed an association between socioeconomic status of the patients and the use of HPs and DS (Larsen, 2012; and Tytlandsvik, 2014). They conclude that among the middle-aged women those who are taking DS are older, have longer education levels and higher income.

The increasing demand for HPs and DS has led to an increased interest by healthcare professionals (Alkharfy, 2010; and Fahmy et al., 2010, Johansen and Toverud, 2006). In a research study that was conducted in Norway, among 149 patients with common cancer diagnoses, 56% used HPs and DS, 36% used them for the cancer itself (Johansen and Toverud, 2006). It should be also noted that the HPs and DS are accessible at many retail settings including pharmacies, health food stores, grocery stores and on the Internet (Lin et al. 2010). Moreover, HPs and DS have less strict regulations and looser manufacturing oversight compared to prescription and non-prescription drugs (Crawford et al., 2005). Many people believe that, HPs and DS are safe, because they are labelled natural (Divya et al., 2012; and Snyder et al., 2009).

It is important to notice that DS and HPs are excluded from the strict regulations and testing required for products classified as prescription drugs. These products are not subject to the approval process of the Norwegian Medicine Agency (NOMA). HPs and DS, therefore, cannot be marketed for treatment, diagnosis or prevention of disease. HPs and DS are not only unregulated by the Food and Drug Administration (FDA), but their use by individuals are often not reported to health care providers (Martin et al. 2002; and Djuv et al., 2013). The FDA released a strategy for DS in 2004 that would focus on monitoring and evaluating product and ingredient safety, ensuring product quality, as well as monitoring and evaluating product labelling. Norway and other Scandinavian countries, has also developed a guideline/authorization procedure for HPs and DS in 1992-1994 ( Guidelines 1994; Helboe and Bager. 2001; Strandberg and Skjøberg 1995). If these products are not granted a marketing authorization, they can be sold as HPs and DS but no medicinal claims may be made for them. According to regulatory situation of herbal medicines, A worldwide Review, these products are not classified as medicines unless they have been registered through the marketing authorization process with the Norwegian Medicines Control Authority.

With respect to the safety, the requirements are based on the WHO” Guidelines for the assessment of Herbal Medicines” of 1991, as are also the requirements for efficiency.

The focus of these measures is to protect consumers against dietary supplements that are unsafe, as well as those making unauthorized, false, or misleading claims. However, no policy has been adapted to date and many questions regarding the efficacy, safety, and purity of these substances remain (Bent, 2008; Ernst, 2002; Ernst, 1998; and Gurley et al., 2000).

### 1.3 Herbal products /dietary supplements and dementia patients

It is claimed that some HPs and DS are helpful for memory and mental health problems, even though the scientific evidence is sparse or lacking (Lavretsky 2009; Gestuvo and Hung 2012; and Sydenham et al., 2012). The results of several research studies indicate that HPs and DS are used by high percentage of demented patients (Dhikav et al., 2012; Thorpe et al., 2012; and Risvoll et al., 2014). A Norwegian study in the general practitioners care discovered a concurrent use of herbs and anticoagulants in 40 % of the patients, which represents a potential threat to patient safety (Djuv et al., 2013). According to this study high percentage of patients who use conventional drugs, co-use HPs. They also conclude, “in order to monitor co-use, all general practitioners should ask their patients routinely to disclose their use of herbs”. The results of a survey conducted in Bodø, Norway, showed that 46% of the 151 demented patients, who participated in the study, have used at least one type of HPs and DS (Risvoll, et al., 2014).

The results of several studies have shown side effects of HPs and DS in the general population (Bjelakovic et al., 2014; Bello et al., 2012; Saper et al., 2008; and Divya et al., 2012). In addition, the high percentage of herbal remedies co-use among patients using conventional medicines and interaction between them have been received increased attention (Yang et al. 2010; Van et al., 2011; Djuv et al. 2013; Gardiner et al., 2015; and Dergal et al., 2002). Possible interactions between HPs and DS and prescribed drugs have been detected in 30-40 % of herb users in some studies (Dergal et al., 2002; and Bush et al., 2007), although the clinical relevance of these interactions is still debated (Kanji et al., 2012; Gurley et al., 2012; Yang et al. 2010). From 2008 through 2011, the Department of Health and Human Service, Food and Drug Administration (FDA) received 6,307 reports of health problems –advers event reports- for DS most of which were linked with supplements containing a combination of ingredients, such as vitamins and minerals (GAO, 2013). Moreover, some of these HPs and DS may have potential interactions with conventional drugs e.g. between Ginkgo biloba and warfarin (Dergal et al., 2002; Bush et al., 2007; and Solhaug and Nergard, 2010).



#### 1.4 Problem statement

Data from the literature (Dhikav et al., 2012; Thorpe et al., 2012; Risvoll et al., 2014) suggest that HPs and DS are in widespread use among dementia patients. Due to the cognitive symptoms in dementia, patient safety may even be of a greater concern in dementia patients compared to other patient groups. The preliminary data from a pilot study by Risvoll, Musial and Giverhaug in 2014 showed that the use of, HPs and DS is not sufficiently controlled in this patient group, as only 36% of these patients received help from other, family or home care, to take the HPs and DS correctly. Other studies have demonstrated that different parts of the health care system e.g. general practitioners, nurses and pharmacist do not focus on the co-usage of HPs and DS (Kemper et al., 2006; Silverstein and Spigel, 2001; Tabet et al., 2010). Therefore, in order to improve the safety of dementia patients it is important to increase awareness about the use of HPs and DS among dementia patients, the primary care givers, all relevant health care personnel, health care politicians and educational institutions.

Pharmacists are in an ideal position to educate and advise patients about the use of HPs and DS (Boon et al. 2009; Kwan et al., 2006; and Duraz et al., 2011). However, they also play an important role as information providers for patients who consume HPs and DS (Fahmy et al., 2010). According to a study conducted in the US, pharmacists get more queries from patients about HPs and DS than ever before (Clauson et al., 2003; Duraz et al., 2011). But, the result of a study in the US and Canada shows that pharmacists perceived they did not have sufficient knowledge about HPs and DS, and they are not educated adequately in this area (Kwan et al., 2006). The same conclusion was drawn by similar studies in United Arab Emirates (Fahmy et al., 2010), Saudi Arabia (Alkharfy, 2010) and other countries (Adisa and Fakeye, 2006). Therefore, we believe patients' safety with regard to the use of HPs and DS is very important and can be improved by increasing the knowledge of pharmacists. For example, Ginkgo biloba interact with anticoagulant therapies such as warfarin through alteration of hepatic metabolism, and should be avoided in patients who use anticoagulants (Roland and Nergård, 2012; Ramsay, 2005; Joseph, 2007; Ernst, 2002; and Samuels 2008). Hence, it is important to study the attitudes, knowledge, and professional practice behaviour of pharmacists. Such type of study will help to propose some recommendations for improvement of patient safety

## 2 Aim and objectives

The overall objective of the study is to increase patient safety, with special emphasis on dementia patients and their use of HBs and DS by focusing on the pharmacy workers. More specifically, the aims of the study were to investigate knowledge, attitudes, responsibility and practical behaviour among pharmacists/pharmacy technicians in Nordland County of Norway concerning the use of HPs and DS.

### 3 Material and Method

*The purpose of this chapter is to provide a brief introduction to the research method and material.*

#### 3.1 Material

The research is started by a literature study in order to explore existing knowledge and information with respect to use of herbal products and dietary supplements by patients with dementia. Several databases (PubMed, Embase, and Cochrane) were searched using keywords such as herbal products, natural products, natural remedies, complementary medicine, dietary supplements, safety, knowledge, attitude, practical behaviour combined with the pharmacy, dementia disease, pharmacist and dementia patients.

The survey was conducted in the Autumn 2014 and Spring 2015 in Norland County of Norway. The pharmacy workers included pharmacists with 3-5 years of education at the university, pharmacy technicians with or without formal education at high school and others with another background. Pharmacies in the municipalities of Bodø, Fauske, Meløy, Mo I Rana, Saltdal, Vestvågøy, Vågan, Sortland and Narvik were invited to participate in the survey. The manager at each pharmacy and also the regional manager of each pharmacy chain of Norland County were contacted in advance to ask if they could consider being involved in the study.

Twenty-three pharmacies were asked to participate in the study. One pharmacy declined to participate. Thereafter, an invitation letter was sent to 22 pharmacies with a total of 195 employees, out of which 43 pharmacy workers declined to participate. The Questionnaire was sent to 153 participants that were interested to participate in the study. At the end, we have received response form 105 pharmacy workers and 48 of those who accepted to participate in the survey did not answer (See Figure 3.1).

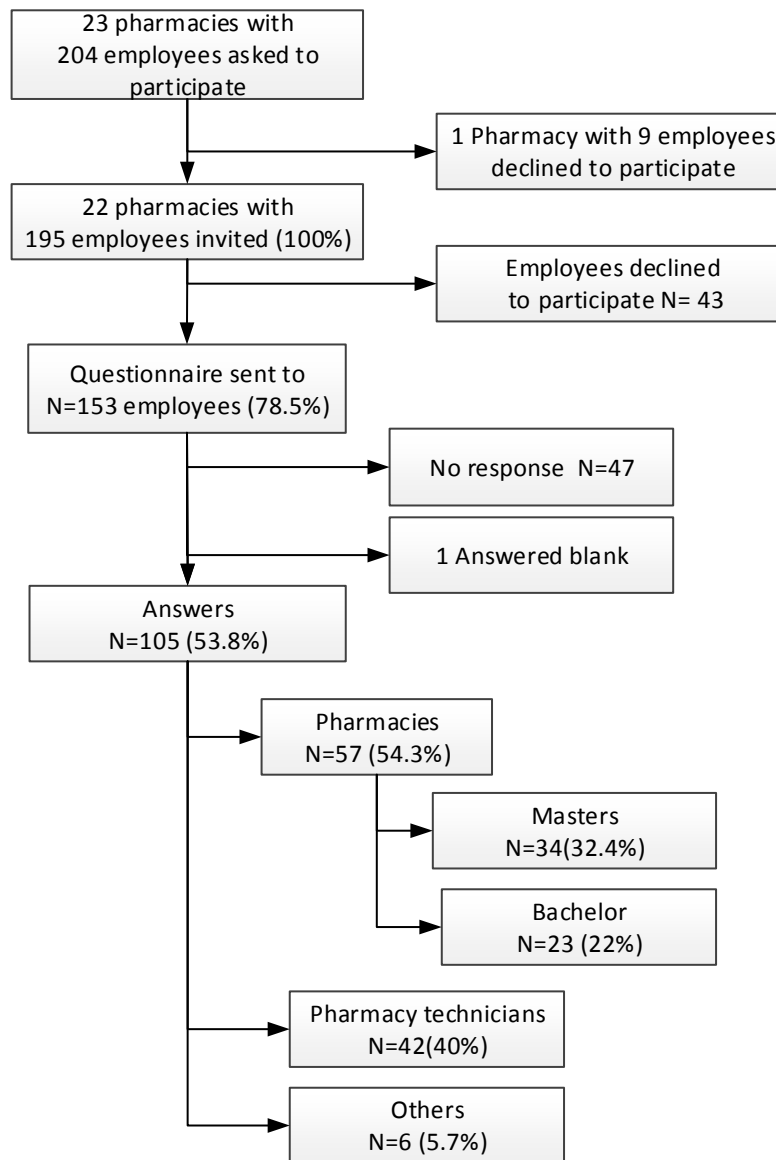


Figure 3.1: Flow chart of the survey population

## 3.2 Method

The research study is a descriptive cross-sectional survey and an electronic questionnaire-based study.

### 3.2.1 Questionnaire development

The questionnaire (Appendix I.) for the survey has been developed in four pages and consists of the following five thematic sections.

- The first section contained questions about demographics data

- The second section was about attitudes of pharmacy workers toward use of HPs and DS, for example pharmacy workers' belief in the beneficial effect and safety of DS and HPs on dementia disease.
- The third section was about pharmacy workers' opinion regarding responsibilities about DS and HPs.
- The fourth section asked about practice behaviors of pharmacy workers toward HPs and DS in dementia patients.
- The last part of the questionnaire investigated knowledge of pharmacy workers on HPs and DS, methods used to gain knowledge about natural products, pharmacy workers' knowledge of use of selected herbs, their perception towards the use of herbal products and whether use involves a risk of reduced health.

After designing a preliminary version of the questionnaire in Autumn 2014, a pilot study were conducted.

### 3.2.2 Pilot study

A pilot study was carried out by distributing the questionnaire to 15 pharmacy workers in Tromsø. They were not included in the main study. The aim was to enhance question clarity, check the readability and understanding of questions, as well as the length of the questionnaire. Questions have been given in Quest back. They were asked to complete the questionnaire under observation and any inaccuracies in the wording of the questions or other ambiguities were clarified and a test-retest measurement of reliability was conducted. Thereafter, based on the results of pilot study, the questionnaire is revised and finalized.

Thereafter, all managers of 23 pharmacies in the Norland County were contacted again by phone. With reference to the first conversation, they were asked to make the invitation letter and survey known to their employees, in order to get e-mail addresses of interested pharmacy workers. Thereafter, an invitation letter ( Appendix II) was sent to the pharmacies that responded positive to the inquiry. The invitation letter contained a description of the project, the aim of the survey, information about Quest back questionnaires and invitation to participate to the survey (appendix 1). About 22 invitation letters was sent to the 22 pharmacies in the Norland County and we got about 153 e-mail addresses for the pharmacy workers.

The questionnaires were dispatched to 153 pharmacy workers in the beginning of December 2014. The response rate was low at first, so a reminder to answer the questionnaire was sent by e-mail 3 times. We received 35 answers from pharmacy workers after the first invitation, and total of 105 answers after the third reminder.

### 3.2.3 Data evaluation, analysis and interpretation:

Data were managed and analysed using The Statistical Package for social Sciences (SPSS version 22.0). Pearson's Chi-square was used for analyses of potential associations between the variables. In two-times-two tables with more than 1 cell of expected values less than 5, Fisher exact test was used. P values (two-sided) less than 0.05 were considered as statistically significant.

### 3.2.4 Handling of variables

In some analyses the chi-squared test was not valid because more than 20% of the expected numbers were under 5. To avoid this problem some categories in some variables were merged. The four level variable "education" was in some analyses dichotomized into pharmacists and non-pharmacists. In the four level variable "years of experience" the lowest two categories were merged into "less than 5 years" in some analyses.

The three level variable "belief in the beneficial effect" was dichotomized into "No" and "Yes or don't know". The three level variable "use of HPs and DS may involve a risk to reduce health" was in some analyses merged into "Yes" and "No or Don't know".

In some cases in order to analysis the data, we catagorized the text answers from each participant. For example in question 9, the text answers from participants grouped as follow:

1. No, don't have common or special routines
2. Explain in an easier way/repeat the information/deliver out written information
3. Contact GP and/or relatives and/or homecare

Which the following answer were categorized in group 1:

"This varies from customer situation. Many people are aware that they do not realize what is being said and communicated, and they want that we contact home care or relatives".

In some analyses there was missing information from one or more participants. In these cases, the participants with missing information were excluded from the analysis.

## 4 Results

*The aim of this chapter is to present the results of data analysis with respect to the aim of the research, which are attitude, knowledge and professional practical behaviour of pharmacy workers in Nordland County of Norway.*

### 4.1 Demographic data

In total, 153 pharmacy workers in Nordland County of Norway (79% of a total of 195 pharmacy workers) were included in the survey. A total of 105 pharmacy employees responded to the questionnaire. The response rate was  $105/195=54\%$  (See Figure 3.1).

The demographic data of respondents are listed in Table 4.1. It includes characteristics of respondents with respect to gender, level of education, and years of experience. The majority were women (89%) and most had more than 5 years of experience (70%). Fifty four percent Pharmacists participated in the survey.

Table 4.1. Demographic information for participated pharmacy workers (n= 105)

	N	%
Gender		
Women	93	88.6
Men	12	11.4
Level of education		
Masters	34	32.4
Bachelor	23	21.9
Pharmacy technicians	42	40.0
Others	6	5.7
Years of experience		
Less than one year	4	3.8
1-5 years	28	26.7
6-15 years	39	37.1
>16 years	34	32.4

### 4.2 Knowledge

#### 4.2.1 Source of knowledge

The result of survey with respect to the sources of knowledge of pharmacy workers about HPs and DS are presented in Figure 4.1. They also get some of their knowledge from family and friend but ranked in the end which is not included in Figure 4.1. In addition, there was Few (14%) of the respondents have participated in courses about HPs and DS, but 60% of these courses was organized in order to more sell and marketing of these products.

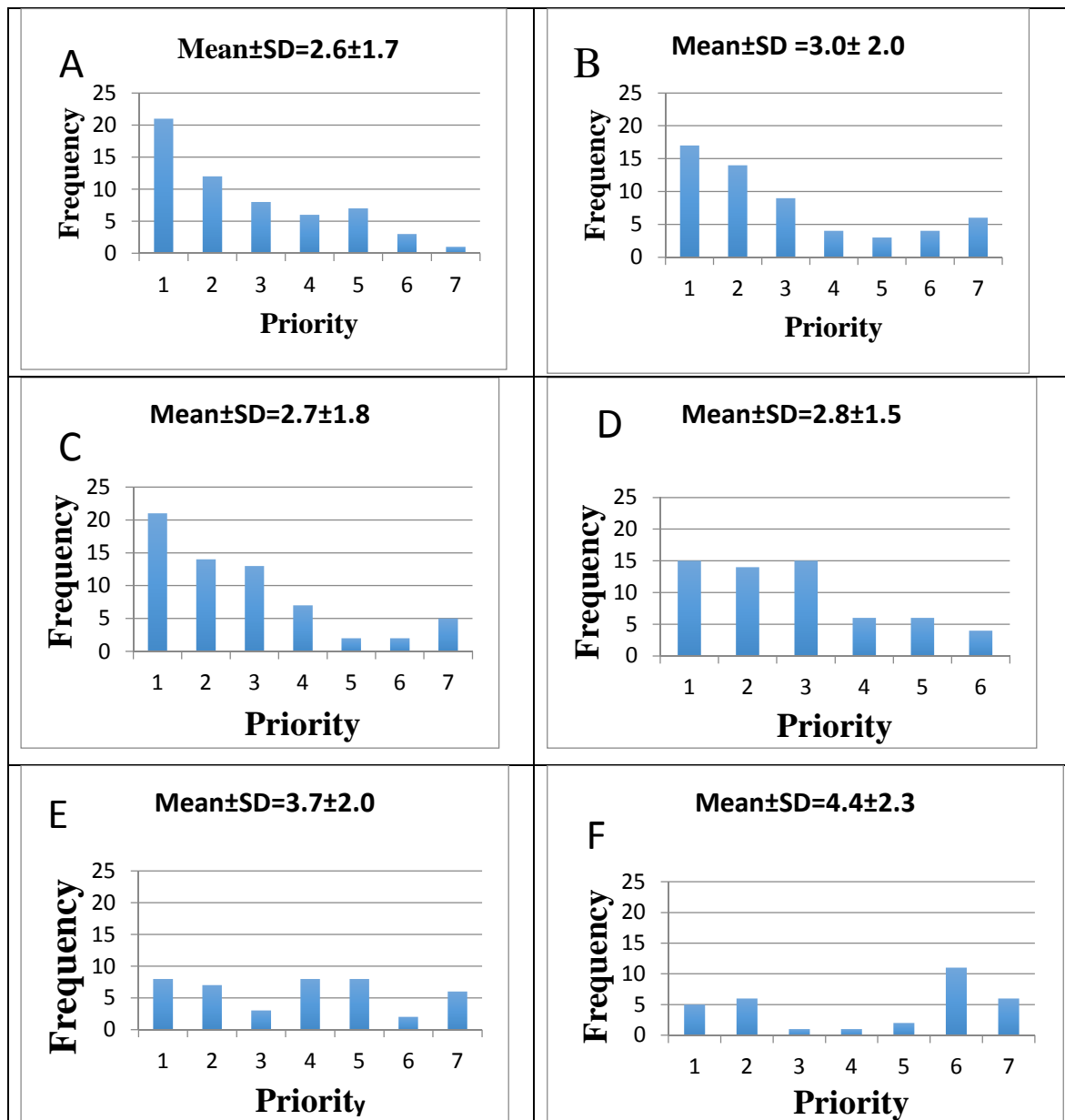


Figure 4.1. Sources of knowledge using by pharmacy workers of Nordland County

A: Education; B: Books/ scientific articles; C: Internet sites acknowledged by Norwegian health authorities / pharmaceutical specialist environment; D: Product brochure, E: Course about herbal products; F: Mass media/ Magazines

We asked pharmacy workers to answer the following question about about the use of HPs and DS for dementia:

- Which one of the following herbal products should not be taken by dementia patients, who are using warfarin?



The result of the analysis is presented in Table 4.2. 35 (34%) of participants had selected both Ginkgo biloba and St. John's wort, which are the correct answers. However, 97 (95%) of pharmacy workers mentioned that the St. John's wort should not be combined with Warfarin

Table 4.2. Pharmacy worker's knowledge of use of a selected unfavorable drug-herb combination (N=102<sup>A</sup>)

Herb selected	Herb that should not be combined with Warfarin <sup>B</sup> , n (%)
Ginkgo biloba	60 ( 58.8)
St. John's wort	97 ( 95.1)
Salvia officinalis	16 ( 15.7)
St. John's wort and Ginkgo biloba	35 (34.3%)
Echinacea	17 (16.7)

<sup>A</sup>There was missing information from 3participants.

<sup>B</sup> Participants could select more than one option.

#### 4.2.2 Perception about the use of HPs and DS in Dementia patients

Table 4.3 shows the perception of pharmacy workers about the use of HPs and DS in Dementia patients. The results show 60% of pharmacy workers agreed on the statement that, the use of HPs and DS may involve a risk of reduced health and are aware of risks regarding use of these products. 28% were uncertain. But, 13% of them believe that there is no risk of reduced health when dementia patients use HPS and DS.

There was highly significant difference in this aspect based on the level of education if we consider the education into categories "Pharmacists" and "non-pharmacists" with p-value less than 0.001 (See Table 4.3). More pharmacists than non-pharmacists believed that the use of HPs and DS may involve a risk of reduced health. The result of analysis also indicate that there was no statistically significant difference in the pharmacy workers' perception about the fact that the use of HPs and DS may involve a risk of reduced health, based on years of experience and gender when we dichotomized "Yes" and "Don't know" categories into " No or Don't know" (See Table 4.3).

Table 4.3. Pharmacy workers' perception about the statement that use of HPs and DS may involve a risk to reduce health. (N=104<sup>A</sup>).

Characteristics	Pharmacy workers' perception n (%)				P-value <sup>B</sup>
	Yes	No	Don't know	No or Don't know <sup>C</sup>	
Total population	62 (59.6)	13 (12.5)	29 (27.9)		
Gender					
Female	<b>52 (56.5)</b>	12 (13.0)	28 (30.4)	<b>40 (43.5)</b>	0.12
Male	<b>10 (83.3)</b>	1 (8.3)	1 (8.3)	<b>2 (16.7)</b>	
Level of education					
Masters	27 (79.4)	1 (2.9)	6 (17.6)		
Bachelor	17 (73.9)	5 (21.7)	1 (4.3)		
Pharmacists <sup>D</sup>	<b>44 (77.2)</b>	<b>6 (10.5)</b>	<b>7 (12.3)</b>		<0.001 <sup>G</sup>
Pharmacy technicians and others <sup>E</sup>	<b>18 (38.3)</b>	<b>7 (14.9)</b>	<b>22 (46.8)</b>		
Years of experience					
Less than 5 years <sup>F</sup>	<b>19 (61.3)</b>	4 (12.9)	8 (25.8)	<b>12 (38.7)</b>	0.98
5-16 years	<b>23 (59.0)</b>	6 (15.4)	10 (25.6)	<b>16 (41.0)</b>	
>16 years	<b>20 (58.8)</b>	3 (8.8)	11 (32.4)	<b>14 (41.2)</b>	

<sup>A</sup> There was Information missing from 1 participant.

<sup>B</sup> P-value analyzed with Pearson Chi-Square or Fisher's exact test if the number of one cell was below five.

<sup>C</sup> A merge of the responses "No" and "Don't know".

<sup>D</sup> A merge of the categories "Master" and "Bachelor".

<sup>E</sup> A merge of the categories "Pharmacy technician" and "Others".

<sup>F</sup> A merge of the categories "Less than 1 year" and "1-5 years".

<sup>G</sup> P-value for comparison of pharmacists and non-pharmacists .

## 4.3 Attitude

### 4.3.1 Safety and efficiency of DS

The aim was to assess the belief of pharmacy workers about the beneficial effect of HPs and DS on the dementia patients. The result of analysis is presented in Table 4.4. It shows that 40 (39%) of the respondents dismissed the statement that herbal products have a beneficial effect on dementia disease and only 9 (9%) agreed on the beneficial effect with the use of DS and HPs and the rest are uncertain. The result of analysis also shows more men than women pharmacy workers did not believe in the beneficial effect of HPs and DS. In order to calculate the P-value, we have to merge both categories of "Yes" and "don't know" in order to gain the validity of the test.

There was no statistically significant difference in the pharmacy workers' belief in beneficial effects of herbal products based on level of education and years of experience ( $p > 0.05$ ). While there was a statistically significant difference between the gender and belief in the beneficial effect of herbs if we merge categories "Yes" and "Don't know" together as "Yes or Do not know" ( $p < 0.05$ ).

Table 4.4. Pharmacy workers' belief in the beneficial effect of HPs and DS on dementia (N= 104<sup>A</sup>)

Characteristics	n (%)				P-value <sup>B</sup>
	Yes	No	Don't know	Yes or Don't know	
<b>Gender</b>					
Female	8 (8.6)	<b>32 (34.4)</b>	53 (57.0)	<b>61 (65.6)</b>	0.019
Male	1 (9.1)	<b>8 (72.7)</b>	2 (18.1)	<b>3 (27.3)</b>	
<b>Level of education</b>					
Masters	4 (12.1)	<b>17 (51.5)</b>	12 (36.4)	<b>16 (48.5)</b>	0.13
Bachelor	1 (4.3)	<b>9 (39.1)</b>	13 (56.5)	<b>14 (60.9)</b>	
Pharmacy technicians <sup>C</sup> and others	4 (3.8)	<b>14 (13.5)</b>	30 (28.8)	<b>34 (70.8)</b>	
<b>Years of experience</b>					
Less than 5 years <sup>D</sup>	2 (6.5)	<b>10 (32.3)</b>	19 (61.3)	<b>21 (67.7)</b>	0.70
5-16 years	4 (10.3)	<b>16 (41.0)</b>	19 (48.7)	<b>23 (59.0)</b>	
>16 years	3 (8.8)	<b>14 (41.2)</b>	17 (50.0)	<b>20 (58.8)</b>	

<sup>A</sup>There were information missing from 1 participant.

<sup>B</sup>P-value analyzed with Pearson Chi-Square or Fisher's exact test if the number of one cell was below five.

<sup>B</sup>The P-value is calculated for both categories of "no" and "yes or Don' know".

<sup>C</sup>A merge of the categories " Pharmacy technician" and "Others".

<sup>D</sup>A merge of the categories "Less than 1 year" and "1-5 years".

Pharmacy workers who believed that DS and HPs have beneficial effect on dementia disease, reported the following product as beneficial for dementia patients: Omega -3 fatty acid, Cod liver oil, Folic acid, Vitamin E, Antioxidants like vitamin C, Flavonoids, Lecithin, Cranberries, Garlic, Ginger and Ginkgo biloba extractum.

#### 4.3.2 Pharmacy worker's use of DS and HPs (Self-treatment) and recommendation to patients

The result of our survey on the pharmacy workers' practice of using HPs and DS for self-treatment showed that 38% of the respondents had used herbal therapy in their lifetime for treatment of their own ailments. Based on the finding from Table 4.5, around half of men use DS and HPs for self-treatment, which higher than women, but the difference is not statistically significant. The result indicates that all men in this study who use DS and HPs have high level of education and long experience. Also, There is a highly statistics significant between the pharmacy worker's own use of HPs and DS and recommendation to the patients.

Table 4.5. Pharmacy workers' use of DS and HPs for self-treatment (N=104<sup>A</sup>)

Characteristics	n (%)		P-value <sup>B</sup>
	Yes	No	
Gender			
Female	33 (35.5)	60 (64.5)	0.3
Male	6 (54.5)	5 (45.5)	
Level of education			
Master	16 (48.5)	17 (51.5)	0.21
Bachelor	9 (39.1)	14 (60.9)	
Pharmacy technicians and others <sup>C</sup>	14 (29.2)	34 (70.8)	
Years of experience			
Less than 5 years <sup>D</sup>	9 (29.0)	22 (71.0)	0.31
6-15 years	14 (35.9)	25 (64.1)	
> 16 years	16 (47.1)	18 (52.9)	
Recommendation <sup>E</sup>			
Yes	21 (58.3)	15 (41.7)	0.001 <sup>F</sup>
No	17 (25.8)	49 (74.2)	

<sup>A</sup>There were information missing from 1 participant.

<sup>B</sup>P-value analyzed with Pearson Chi-Square or Fisher's exact test if the number of one cell was below five.

<sup>C</sup>A merge of the categories " Pharmacy technician" and "Others".

<sup>D</sup>A merge of the categories "Less than 1 year" and "1-5 years".

<sup>E</sup>There were information missing from 3participants.

#### 4.3.3 Pharmacy workers' opinions regarding responsibility for and superior actions about proper use and check of DS and HPs among dementia patients

We asked the participants about who should be responsible for ensuring proper use of HPs and DS in people with dementia (Figure 4.2). It shows the average ranking. According to the Figure 4.2, the participants suggested that the dementia patient him-/herself should not be responsible for proper use of HPs and DS (Mean priority=4). On the other hand general practitioners got the highest responsibility ranking (Mean priority=2) and were seen as the main safe guardians for dementia patients. The pharmacy workers ranked themselves behind the other health workers.

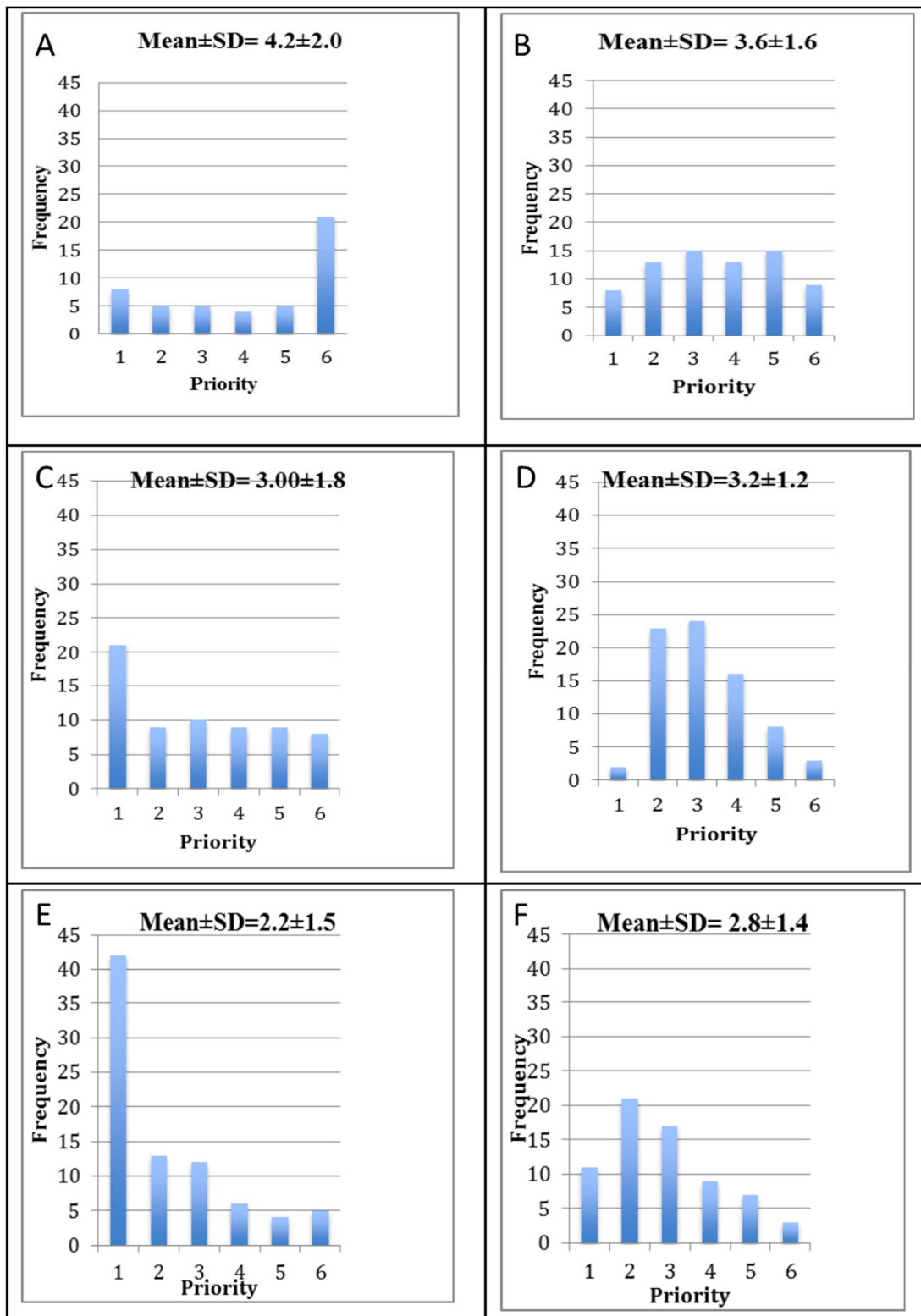


Figure 4.2. Opinion of pharmacy workers for the responsibility to ensure the proper use of HPs and DS in people with dementia. Panel A: The patient; Panel B: Relative; Panel C: Manufacturer; Panel D: Pharmacy; Panel E: General Practitioner (GP); Panel F: Home nursing care

Ranking after the first priority: Panel E: General practitioner 40%, Panel C: Manufacturer 20%, Panel F: Home nursing care 11%, Panel A: The patient 8%, Panel B: Relative 8% and Panel D:

pharmacy 2%. The first priority were not selected by several participants and therefore the total percentage are less than 100%.

The result of analysis (Table 4.6) show that 65 (63%) of the pharmacy workers believe that the general practitioner should be responsible for the routinely checking of interaction between HPs and DS and patients' conventional drugs. More than half of pharmacists are of this opinion. However, there were no statistically significant differences in opinion between different levels of education.

Table 4.6 Pharmacy workers' opinion regarding responsibility for the routinely checking of interaction between HPS and DS and patients' conventional drugs (N=104<sup>A</sup>)

Characteristics	Responsible persons		P-value
	General practitioner, n (%)	Pharmacy, n (%)	
Level of education			
Pharmacists <sup>B</sup>	32 (57.1)	24 (42.9)	0.26
Master	21 (61.8)	13 (38.2)	
Bachelor	11 (50)	11 (50)	
Pharmacy technicians and others	33 (70.2)	14 (29.8)	

<sup>A</sup>There was information missing from 1 participant.

<sup>B</sup>Combination of categories "Master" and "Bachelor".

The result of analysis with respect to superior actions suited to ensure dementia patients' correct use of drugs is illustrated in Figure 4.3. It shows the average ranking. The category "More active attitude among general practitioner (GP): GP's should ask all patients about the use of herbal remedies and check for side effects and interactions" got the highest priority from pharmacy workers. Information from the health authorities to the general population and changes in legislation and regulation of HPs and DS were not considered suitable actions to ensure drug safety for dementia patients (Figure 4.3, Panel A and B). According to pharmacy workers, primarily GPs or home nursing care (Figure 4.3, panel C and D) should take hold. Pharmacies were ranked third (Figure 4.3, Panel E). Category "Dispense herbal remedies together with conventional medicines in multidose" was ranked sixth between these superior actions, and get the lowest priority from the pharmacy workers.

Ranking after the first priority: Panel C: More active attitude among general practitioner (GP) 43%, Panel A: Information from the health authorities to the general population 14%; Panel D: More active attitude in home care 8%, Panel B: Changes in legislation and regulation of natural remedies 8%; Panel E: More active attitude among pharmacy workers 5% and Panel F: Dispense herbal remedies together with conventional medicines in multidose 3%. The first priority were not selected by several participants and therefore the total percentage are less than 100%.

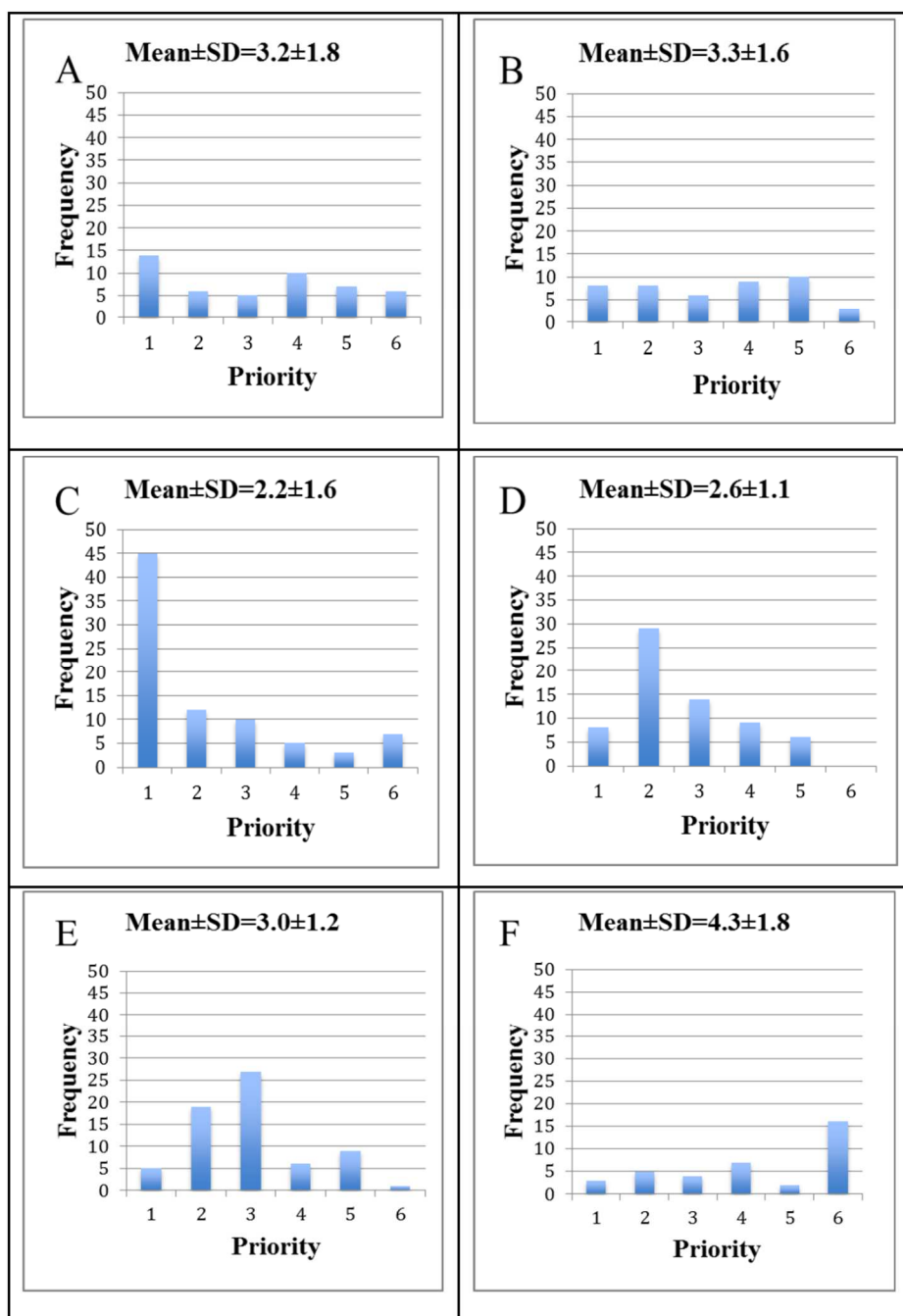


Figure 4.3: Superior actions, which can be suited to ensure correct use of drugs by dementia patients (several options were possible in this question).

Panel A: Information from the health authorities to the general population;

Panel B: Changes in legislation and regulation of natural remedies;

Panel C: More active attitude among general practitioner (GP): ask all patients about the use of herbal remedies and check for side effects and interactions;

Panel D: More active attitude in home care: communicate the answer with General practitioner and /or pharmacy; Panel E: More active attitude among pharmacy workers: check for interactions in all persons buying herbal remedies, inform general practitioner

Panel F: Dispense herbal remedies together with conventional medicines in multidose

## 4.4 Practice behaviours with respect to HPs and DS

### 4.4.1 Inquire about patients' use of HPs and DS

Table 4.7 shows that over half of employees do not ask patients who retrieve prescribed medications about use of HPs and DS. Only 17% of participants checked for interactions as a routine. The results also show that 98% of the pharmacy workers receive questions about HPs and DS on daily basis (11%), weekly basis (40%), monthly basis (31%), and less than one per month (17%). Ninety one percent of pharmacy workers ask about customer's use of conventional medicine when they sell DS/HPs at least sometimes.

Table 4.7. Pharmacists' current practice with regard to HPs and DS

Question	N	%
How often do you get inquiries from consumers regarding the use of herbal remedies? N=103 <sup>A</sup>		
Daily	11	10.7
Weekly	41	39.8
Monthly	32	31.1
Less than monthly	17	16.5
Never	2	1.9
When dispensing conventional medicines, do you routinely ask whether the patient use herbal remedies? N=103 <sup>B</sup>		
Yes	2	1.9
No	57	55.3
In certain cases	44	42.7
Independent of procedures, do you ask the customer whether they uses conventional medicine when you sell herbal remedies? N=104 <sup>C</sup>		
Yes, always	26	25
Only when I think there is a reason for this from the customer's estimated health condition	9	8.7
Only at certain herbal remedies	60	57.7
No	9	8.7
Does your pharmacy have procedures to check for potential drug interactions on the sale of natural products? N=102 <sup>D</sup>		
Yes, always	17	16.7
Yes, but only at certain herbal remedies	52	51.0
Yes, but only in special customer groups	15	14.7
Yes, only by certain drugs	33	32.4
No	17	16.7

<sup>A</sup>There were data missing from 2 participants; <sup>B</sup>There were 2 missing information from participants; <sup>C</sup>Data from one informant was missing; <sup>D</sup>Data from three informants was missing

### 4.4.2 Sources, quality and availability of information

Pharmacy workers use different sources to get information about HPs and DS (see Table 4.8). The most widely used information sources were unspecified Internet, manufacturer, RELIS and pharmacy intranet. With respect to the availability and quality of information, 43% of pharmacy workers mentioned that their pharmacy do not have any available manufacturer independent



information for the pharmacy workers about HPs and DS. Few (n=5) reported availability of manufacturer independent information for all the dietary supplements and herbal products sold in their pharmacy. It appears that available information on DS in the pharmacies is mainly manufacturer dependent (see Table 4.9).

Table 4.8. HPs and DS resources used by respondents (n=105)

Information Resource	(%)
Internet	26.7
Manufacturer	17.1
RELIS <sup>A</sup>	11.4
Pharmacy intranet	10.5
Scientific books	5.7
Interaction database	2.0
PubMed	2.0
Internal online courses	2.0
NOMA <sup>B</sup>	1.0
NOEHL <sup>C</sup>	1.0
Scientific articles	1.0
Micromedex	1.0
Google	1.0
Arnica .no	1.0
Pharmaceutical Internetsites	1.0
Examine.com	1.0
Own knowledge	1.0

<sup>A</sup>Regional medicines information centres in Norway.

<sup>B</sup>Norwegian Medicines Agency

<sup>C</sup>The Norwegian Electronic Health Library

Table 4.9. Manufacturer independent and availability of information on DS (N=102<sup>A</sup>)

Does your pharmacy have available manufacturer independent information for pharmacy workers about the herbal remedies you sell?	n	%
Yes, for all herbal remedies	5	4.9
For most of them	21	20.6
For a few	32	31.4
No	44	43.1

<sup>A</sup>There was missing information from 3 participants.

#### 4.4.3 To inform patients about drug-herb interactions and side effects

Table 4.10 shows about half of the respondents always inform patients about drug-herb interactions and side effects, while 9% never do it. Also 91% supply information on possible drug-herb interactions and side effects at least sometimes.

Table 4.10. Notify patients about drug-herb interactions and side effects (N=104<sup>A</sup>)

Characteristics	n (%)				P-value <sup>B</sup>
	Yes	No	Sometimes	No or sometimes <sup>C</sup>	
Gender					
Female	<b>47 (51.1)</b>	8 (8.7)	37 (40.2)	<b>45 (48.9)</b>	0.25
Male	<b>4 (33.3)</b>	1 (8.3)	7 (58.3)	<b>8 (66.7)</b>	
Level of education					
Masters	<b>19 (55.9)</b>	1 (2.9)	14 (41.2)	<b>15 (44.1)</b>	0.6
Bachelor	<b>11 (47.8)</b>	0 (0.0)	12 (52.2)	<b>12 (52.2)</b>	
Pharmacy technicians and others <sup>D</sup>	<b>21 (44.7)</b>	8 (17.0)	18 (38.3)	<b>26 (55.3)</b>	
Years of experience					
Less than 5 years <sup>E</sup>	<b>14 (43.8)</b>	3 (9.4)	15 (46.9)	<b>18 (56.3)</b>	0.77
6-15 years	<b>20 (51.3)</b>	3 (7.7)	16 (41.0)	<b>19 (48.7)</b>	
>16 years	<b>17 (51.5)</b>	3 (9.1)	13 (39.4)	<b>16 (48.5)</b>	

<sup>A</sup>There was missing information from 1 participant.

<sup>B</sup>P-value analyzed with Pearson Chi-Square or Fisher's exact test if the number of one cell was below five.

<sup>C</sup>P-value is calculated for both categories of "Yes" and "No or Sometimes".

<sup>D</sup>A merge of categories "No" and "sometimes".

<sup>E</sup>A merge of the categories "Pharmacy technician" and "Others".

<sup>F</sup>A merge of the categories "Less than 1 year" and "1-5 years".

#### 4.4.4 Recommendation of HPs and DS to patients

It was showed that 36% of the participants recommend use of HPs and DS to patients without customers asking for it first. There was a statistically significant association between recommendation and years of experience when we merged categories "less than 1 years" and "1-5 years" together into "less than 5 years". Pharmacy workers with 6-15 years of experience recommended patients regarding DS and HPs more than the other pharmacy workers with both less than 5 years and more than 16 years of experience as is shown in Table 4.11. But there was no statistically significant difference regarding gender and education.

Table 4.11. The attitudes of pharmacists towards recommendation patients about use of HPs and DS (n=103<sup>A</sup>)

Characteristics	Recommendation on herbs		P-value <sup>B</sup>
	Yes	No	
Gender			
Female	31	60	0.34
Male	6	6	
Level of education			
Masters	16	18	0.15
Bachelor	5	18	
Pharmacy technicians and others <sup>C</sup>	16	30	
Years of experience			
Less than 5 years <sup>D</sup>	9	23	0.025 <sup>E</sup>
6-15 years	20	18	
> 16 years	8	25	

<sup>A</sup>There were missing information from 2 participants.

<sup>B</sup>P-value analyzed with Pearson Chi-Square or Fisher's exact test if the number of one cell was below five.

<sup>C</sup>A merge of the categories "Pharmacy technician" and "Others".

<sup>D</sup>A merge of the categories "Less than 1 year" and "1-5 years".

With regard to the pharmacy workers' reasons for giving recommendation to patients about use of DS and HPs without patients asking for this, majority of the pharmacy workers who did this, reported documented effect as a reason, and about half reported that it was because of belief in cure or relief of illnesses (See Table 4.12). More than one reason could be given.

Table 4.12. Pharmacy workers' reasons for recommending patients about the use of the DS and HPs. n=37

The reason	Frequency (%)
Documented effect	27 (73.0)
Belief in cure or relief of illnesses	18 (48.6)
Believe that the patient wants it	10 (27.0)
Do not believe it is harmful	1 (2.7)
Pharmacies desire additional sales	6 (16.2)

Among the 66 pharmacy workers not giving recommendation to use of DS and HPs, the most frequently reported reasons for this view (62%) were the lack of necessary knowledge and risk of drug interaction (See Table 4.13). More than one reason could be given.

Table 4.13. Pharmacy workers' given reasons for not recommending patients about the use of the DS and HPs.n=66

The reason	Frequency (%)
Lack of necessary knowledge	41 (62.1)
Don't believe DS & HP have effect	13 (19.7)
Risk of side effects	28 (42.4)
Risk of drug interaction	41 (62.1)

#### 4.4.5 Documenting and monitoring patients' use of DS among dement patients

The result of analysis shows that eight percent of pharmacy workers had experienced dementia patients using HPs and DS incorrectly. 56 (53%) of pharmacy workers reported on patients unable or possibly unable to receive information due to dementia, 27 (26%) was uncertain, and just 6% were trained to communicate with patients with dementia.

Pharmacies in general do not seem to have routines for managing patients with possible dementia. Half (50%) of the 56 respondents having experienced patients probably unable to receive information due to dementia, indicated that they did not have common practice or written routines in their pharmacy.(See Table 4.14).

Table 4.14: Pharmacy workers' opinion regarding common and written routines in the pharmacy to manage patients with possible dementia (n=56)

	n	Frequency (%)
No, don't have common or special routines	28	50%
Explain in an easier way/repeat the information/deliver out written information	7	12.5%
Contact GP and/or relatives and/or homecare	14	25%
No answer/answers difficult to interpreted	7	12.5%

## 5 Discussion

### 5.1 Discussion of Results

#### 5.1.1 Knowledge

To describe the knowledge of pharmacy workers in Nordland County the following topics were covered in the questionnaire:

- Source of their knowledge
- Their perception about the use of HPs and DS in dementia patients.

The main sources for the knowledge of pharmacy workers about HPs and DS are Internet sites acknowledged by Norwegian health authorities (judged by the Pharmacy employees), product brochure, education, books and scientific articles. However, what the participants mean by the Internet sites acknowledged by Norwegian health authorities is not specified. In addition, product brochure is often if not always delivered by the manufacturer or by the owner of the product. Therefore, health personnel/pharmacy workers should review the quality of the information given in product brochure. Courses about herbal product were also used to gain knowledge about HPs and DS by pharmacy workers in Nordland County. However, many of these courses often run by Pharmaceutical Company in order to provide information and marketing of their product. These sources may not be reliable which may lead to potential errors in dispensing HPs and DS. (Fahmy et al., 2010). There is a need to increase availability of HPs and DS safety data to pharmacy workers, which is also indicated in the research done by Hass and Lewia (2006).

Most of pharmacy workers believe that the use of HPs and DS may involve a risk of reduced health, which means they are aware of risks regarding use of these products. This is an important point with respect to the safety of dementia patients. There was no statistically significant difference in the pharmacy workers' perception about the fact that the use of HPs and DS may involve a risk of reduced health, based on years of working experience. In other words, the number of years of work experience does not affect whether the pharmacy workers considered HPs and DS to potentially contribute to reduction in health. There was highly significant difference in this aspect based on the level of education if we consider the education level into the categories of "pharmacists" and "non-pharmacists" with p-value less than 0.001. More pharmacists than non-pharmacists believed that the use of HPs and DS involved a risk of reduced health. We do not know if more pharmacists than other employees have knowledge

from University education about the fact that the use of HPs and DS lead to risk for potential interactions (Gardiner et al., 2015.).

The result shows that less than 13% of pharmacy workers considered the use of HPs and DS not to involve a risk of reduce health. Their believes in products totally without risk, is neither supported by historical data nor the results of pervious research studies (Bjelakovic et al., 2014; Bello et al., 2012; Saper et al., 2008; and Divya el al., 2012) that have shown side effects of HPs and DS in the general population. This fact may influence the safety of dementia patients as one of the main roles of pharmacists is to counsel the patients regarding their medications. Therefore, we believe this group of pharmacy workers need more information and knowledge about the risk of use of HPs and DS.

As only one question considered the knowledge of pharmacy workers about HPs and DS, “the interaction between Warfarin and some of selected HPs and DS”, it is not possible to make any conclusion. Therefore, we believe a detailed study should be done with respect to the knowledge of pharmacy works in the area of HPs and DS. Moreover, the results of study indicate that the knowledge of pharmacy workers in Nordland County about dementia is low or could have been better as only 34% Gave the correct answer to the knowledge question.

#### 5.1.2 Attitudes of pharmacy workers

To describe the attitudes of pharmacy workers in Nordland County the following topics were covered in the questionnaire:

- Safety and efficacy of DS
- DS in general (Self-treatment)
- Pharmacy workers’ opinion regarding responsibilities about proper use of HPs and DS among dementia patients
- Pharmacy workers’ opinion regarding superior actions, which can be suited to ensure dementia patients’ correct use of drugs

The results of the study indicate that many of pharmacy workers of Nordland County do not believe in beneficial effects of HPs and DS or they do not know about such effects. The results highlight a professional and ethical dilemma faced by pharmacy workers similar to the research

study done by Olatunde et al. (2010). The pharmacy employees work in a pharmacy that offer HPs and DS for sale and they believe there is no benefit in using of these product.

There are few men in our survey and therefor results concerning gender differences become uncertain. For example in Tables 4.4 and 4.5 we did not find any statistically significant association between gender and belief in beneficial effects of HPs and DS. Also, based on the finding from Table 4.5, it seems that more men use natural products for self-treatment compared to women, but there is no significant difference. If the difference was significant it stands in contrast to the National Health Interview Survey of USA in 2007, and other studies that indicated women use wider natural products and are the typical HPs and DS user (Geller and Kroneberg, 2003; Qato, et al., 2008; Skeie et al., 2009). As all men except from one in our survey are pharmacists, even if there were significant gender associations, they could be confounded by education level. Higher education and thereby higher income has been shown to be associated with higher prevalence DS use in several studies (Larsen, 2012 and Tytlandsvik, 2014).

The finding shows that 47% of the pharmacy workers that have more than 16 years working experience use HPs and DS. Whereas, 36% and 30% among those with 6-15 years and less than 5 years use DS and HPs respectively. They may have chronic conditions for instance musculoskeletal problems such as back, neck, or joint pain and other indications of poor health because of age that are associated with an increase in the use of dietary supplements and herbal products. This finding, increase use of dietary supplements by age, is similar to the study from Patrica et al., (Barnes et., 2008)

We found that many of pharmacy workers in Nordland County considered general practitioners to play an important role with respect to the responsibility about proper use of DS and HPs in dementia patients and see themselves less responsible. In contrast, there was a strong agreements by nearly all the participants in the research study done by Olatunde et al. (2010) that pharmacist have a responsibility to monitor natural health products for safety, monitoring and adverse effect. The result of a literature review is also indicated that “most of the literature either explicitly or implicitly identified that pharmacists have a key role to play with respect to Natural health product/dietary supplements” (Boon 2009).

The participants of this research study do not see themselves responsible even though they sell the products and often get questions from customers about it. It may be because of lack of sufficient knowledge on HPs and DS, or lack of time for consultation with the patients at the pharmacy, or they do not believe in the efficacy of these products and that they pose a

potential risk for reduced health. It might be also because of the lack of available reliable sources as we found in our survey. But, the result of another study showed that it is very important for pharmacists to ask their patients directly about the use of HPs and DS before prescribing or delivering conventional drugs (Samojlik et al., 2013).

We found that the Category “Dispense herbal remedies together with conventional medicines in multidose” were ranked sixth, i.e. lowest priority, among the suggested superior actions to ensure correct use of drugs by dementia patients. But it is not clear why pharmacy workers ranked this suggestion in the last as this method can be a safe method to control that the right amount of DS and HD are taken by dementia patients and at the right time.. Possible reason for the rejection of this suggestion can be that many of pharmacy workers believe that HPs and DS are unsafe and possibly harmful. They may not want that these products to be used together in order to avoid possible interactions and side effects. Another possible reason can be that they do not believe that HPs and DS have a beneficial effect on dementia disease as we found in our study (Table 4.4). Other reasons might be fear of extra work, practical difficulties, and that its time consuming. This needs more investigation.

### 5.1.3 Pharmacy workers’ practice behaviours

To describe the practical behaviour of pharmacy workers in Nordland County the following topics were covered in the questionnaire:

- Inquire about patients’ use of DS
- Source of information about DS used by pharmacy workers
- Providing of information about drug-herb interactions and side effects to the patients
- The use of HPs and DS by patients and recommendation of DS to patients who did not ask for this first by pharmacy workers
- Documentation and monitoring patients’ use of DS

Nearly all pharmacy workers in Nordland County of Norway experienced to answer question about HPs and DS. This means that the pharmacy workers play an important role to provide information to the patients. It is therefore essential for pharmacy workers to have a baseline level of knowledge about HPs and DS. But the global community pharmacist knowledge of HPs and DS appears to be poor (Waddington, et al., 2015). Furthermore, this become more important as the result of our study shows that the knowledge of pharmacy workers of Nordland County about the dementia is poor.



Pharmacy workers of Nordland County acquire their information from different sources as presented in Table 4.8. Unspecified Internet and manufacture brochure are used as number 1 and 2 to acquire such information about HPs and DS, which may be classified as unreliable or product dependent. These sources are often not under the oversight of any agency to ensure quality or precision of information ( Clauson, et al, 2003) or in other words much of information on these sources is unregulated which may not be trustable.

The third most used information source was Regional Medicines Information center of Norway (RELIS), which can be classified as a reliable source. It is difficult to determine which one of the remaining sources of Table 4.8 is classified as reliable or unreliable, but we can mention that some of these sources are more reliable than the others. For example, PubMed and Micromedex, that are thought to be reliable source, may also contain small studies that need to be interpreted with care. On the other side unspecified Internet and Manufacturer, which are thought to be unreliable resources, may contain reliable information.

Therefore, it is very important to check the quality of the information. But most of the pharmacies did not have available manufacturer independent information for pharmacy workers about most of the HPs and DS, which they sell according to the informants. The lack of quality information on HPs and DS is also reported by Kwan et al. (2006) and the needs for a greater access to reliable resources are reported by several researchers (Nada et al, 2007). The important point is to critically evaluate information obtained from any sources and sort the reliable information from the questionable information.

For assessing and evaluation of the information located on the Internet, several key items are suggested by Brunetti and Hermes (2010), which can be used by pharmacy workers.

It is important to mention that the increased number of received questions about HPs and DS to the pharmacy workers necessitates the need for more education which can provide reliable and trustable information. This will improve the safety of dementia patients by providing them right information through pharmacy workers. This will improve the ability of pharmacy workers to counsel patients regarding the use of HPs and DS and offer them an optimal pharmaceutical care.

Around 50% of the pharmacy workers do not inform their patients about risk of drug-HPs and DS interaction. This may influence the safety of dementia patients especially in the case if the dementia patients do not receive information from other sources such as the general

practitioner. Based on the result of the analysis in pervious section, the reason for not providing information about the drug-HPs and DS interaction by pharmacy workers can be for instance, they believe that general practitioners are responsible for checking the use of HPs and DS. But from the other point of view, several pharmacy workers (36%) recommended use of HPs and DS to patients without customers asking for it. The pharmacy workers of Nordland County were not trained to communicate with patients with dementia and the pharmacies do not have any routines for managing patients with possible dementia and this is an important issue, which needs to be reolved.

## 5.2 Strengths and weakneeses

The target groups were pharmacy workers, both pharmacists and pharmacy technicians. The focus of other studies that have been done on this topic was only pharmacists. Both pharmacists with 3-5 years of education at the university level and also pharmacy technicians with high school or some without formal education were included in this study since both have the same responsibilities like selling, and providing recommendations and guidance on the use of HPs and DS. More pharmacists than pharmacy technicians participated in the study. But there have been a good number of technicians (46%) also in the study. We believe that the interest for HPs and DS, curiosity surrounding the study and the ability to contribute with their knowledge and experience may have played a role for those who agreed to participate in the survey. Many pharmacy technicians spend most of their time in the Over-The-Counter (OTC) and sell OTC drugs directly to the consumer without a prescription from health care professionals, and also many others products like natural products. So, they can receive question about natural products and OTC drugs to the same degree or even more than pharmacists. Therefore it is important to evaluate the knowledge of the pharmacy technicians as well as the pharmacists as we have done in our study.

The study was restricted to eight municipalities within the County of Nordland. The results do not necessarily reflect the knowledge, attitude and practical behaviour of pharmacy workers in other regions of the country, although we have no indication than this part of the Country is different than others. The municipalities included consist of from 5000-50000 inhabitants, and should be representative when it comes to size. The gender distribution suggests that our data are representative for Norwegian pharmacies. According to the Norwegian pharmacy association (NPA) 88% of Norwegian pharmacy workers are women (Hamberg J, Personal communication, 23.02.2015), which is similar to the percentage of

women who participate in our study, which was 89%. However, our data do not seem as representative based on education. The proportion of pharmacists (54%) in our study is higher than for Norwegian pharmacies in general (41%, NOPA) . One possible reason may be that Nordland County have higher percentage pharmacists than the country has. Another more likely reason may be that more pharmacists were interested in the study and participated in the survey. To achieve higher external validity the survey should be extended to other regions of the country. The number of items concerning knowledge in the questionnaire should be extended in future studies. The current version provided little detailed information about pharmacy worker's knowledge of HPs and DS.

The survey is based on questionnaires, and it is therefore possible to obtain information about different variables, which is an advantage. However, it is not possible to be absolutely sure that the collected information is correct. Participants may have misunderstood the questions, crossed by mistake or conscious under-reported (e.g. recommendation HPs and DS or use of these products). Some participants had not answered some questions. Of those who did not want to participate the survey”, there could be several reasons as a busy working day or having not direct connection/communication with the patients and sell of natural products or could feel uncomfortable by answering the questions.



## 6 Conclusions and recommendation to increase patients safety

### 6.1 Conclusions

Based on the results of data analysis and discussion, the following conclusions were achieved:

- Many of the pharmacy workers receive question about HPs and DS. Thus, the knowledge of pharmacy workers about HPs and DS needs to be improved.
- The availability of high quality information about HPs and DS is scarce in most pharmacies in Nordland county of Norway.
- Most pharmacy workers considered the use of HPs and DS to reduced health and they know the risks regarding the use of these products.
- Most pharmacy workers in Nordland County of Norway do not routinely document or monitor dementia patients' use of DS and HPs.
- Most pharmacy workers express that general practitioners have a very important role as safety provider for dementia patients and see themselves less responsible.
- Most of pharmacy workers do not received enough education with respect to dementia patients.

### 6.2 Recommendation to increase patients safety

Based on the results of analyses, discussion and conclusions of this research study, in order to improve the safety of patients, we recommend the following points:

- In order to increase the knowledge of pharmacy workers, our recommendation is to include a course on natural products in the educational plan of pharmacy in order to provide more training for the new educated pharmacists. Providing training for the pharmacy workers by holding workshops and organizing courses on HPs and DS can also help to increase the knowledge of pharmacy workers. Such trianings, thus can result in improving the safety of dementia patients by providing them correct information through pharmacy workers. It will also improve the ability of pharmacy workers to counsel patients regarding the use of herbal products and offer them an optimal pharmaceutical care.
- With respect to the reliability and quality of sources of information, we suggest to identify a reliable source of HPs and DS that can be available for the health care providers and pharmacy employees, at the work.

- A strategy should be created in order to routinely document and monitor the use of HPs and DS by dementia patients. The roles and responsibilities of the primary care givers, all relevant health care personnel, and health care politicians in terms of checking and controlling the use of HPs and DS by dementia patients should be clarified.

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## Appendix I Questionnaire for Pharmacy workers

1. Kryss av for Kjønn
  - a. Kvinne
  - b. Mann
2. Hvilken utdanning har du?
  - a. Provisorfarmasøyt
  - b. Reseptarfarmasøyt
  - c. Apotektekniker
  - d. Annet
3. Hvor lenge har du jobbet i apotek
  - a. Mindre enn ett år
  - b. 1-5 år
  - c. 6-15 år
  - d. > 16 år
4. Tror du enkelte naturmidler kan ha effekt mot demens enten forebyggende eller symptomatisk?
  - a. Ja
  - b. Nei
  - c. Vet ikke
5. Svarte du ja på spørsmål 4, angi eventuelle produkter som du tenker kan ha effekt?
6. Bruker du eller har du selv brukt naturmidler?
  - a. Ja
  - b. Nei
7. Svarte du ja på spørsmål 6, angi hvilke naturmidler du bruker eller brukte?
8. Har du opplevd kunder som ikke forstår eller får med seg informasjon du gir for eksempel på grunn av mulig demens?
  - a. Ja
  - b. Nei
  - c. Usikker
9. Hvis ja, har dere rutiner/felles praksis på apoteket for å håndtere dette? Spesifiser hvordan? Eller om tilfellene håndteres individuelt, spesifiser hvordan?
10. Kjenner du til kunder med demens som du tror kan ha uheldig bruk av naturmidler?
  - a. Ja
  - b. Nei
11. Hvis ja; hva gjorde du med det?
12. Har du fått undervisning om kundebehandling når det gjelder personer med demens?
  - a. Ja
  - b. Nei

13. Hvis ja, spesifiser i hvilken sammenheng?
14. Hvem synes du bør være ansvarlig for å sikre rett bruk av naturmidler hos personer med demens? Ett eller flere svar er mulig, prioriter alternativene du velger.
- Personen selv
  - Pårørende
  - Selger av produkt (helsekost, nettbutikk, terapeut e.l.)
  - Apotek
  - Fastlege
  - Hjemmesykepleie
15. Hvis man rutinemessig skal sjekke om et naturmiddel kan interagere med pasientens legemidler, hvem bør ha ansvaret?
- Farmasøyt
  - Fastlege
16. Hvor ofte får du spørsmål fra kunder om bruk av naturmidler?
- Daglig
  - Ukentlig
  - Månedlig
  - Sjeldnere enn månedlig
  - Aldri
17. Får du spørsmål om naturmidler kunden har kjøpt andre steder enn på apoteket?
- Ja
  - Nei
18. Hvis Ja; gir du informasjon om produkter ditt apotek ikke selger?
- Ja
  - Nei
19. Har ditt apotek en prosedyre/rutine for å tilby naturmidler som mersalg?
- Ja
  - Nei
20. Har ditt apotek prosedyrer for å sjekke for potensielle legemiddelinteraksjoner ved salg av naturmidler? Flere svaralternativ er mulig.
- Ja, alltid
  - Ja, men kun ved visse naturmidler
  - Ja, men kun hos spesielle kundegrupper
  - Ja, kun ved visse legemidler
  - Nei
21. Hvis pasienten ønsker å kjøpe et naturmiddel; spør du hva pasienten skal bruke produktet mot?
- Ja
  - Nei
  - Av og til
22. Ved utlevering av legemidler; spør du rutinemessig om pasienten bruker naturmidler?
- Ja
  - I visse tilfeller

- c. Nei
23. Anbefaler du noen ganger bruk av naturmidler til kunder uten at kunden spør etter dette først?
- a. Ja
  - b. Nei
24. Hvis du svarte Ja på spørsmål 23; ut fra hvilke kriterier anbefaler du bruk?
- a. Dokumentert effekt
  - b. Tro på helbredelse eller lindring av plagene
  - c. Tror kunden ønsker det
  - d. Tror uansett ikke det er skadelig
  - e. Apotekets/kjedens ønske om mersalg
25. Hvis du svarte Nei på spørsmål 23; hvorfor ikke? Flere svaralternativ er mulig.
- a. Mangler nødvendig kunnskap til å anbefale
  - b. Tror ikke naturmidler har effekt
  - c. Risiko for bivirkninger
  - d. Fare for legemiddelinteraksjoner
26. Gir du informasjon om mulige bivirkninger av naturmidler, herunder interaksjoner med legemidler?
- a. Ja
  - b. Nei
  - c. Av og til
27. Uavhengig av prosedyrer, spør du om kunden bruker legemidler når du selger naturmidler?
- a. Ja, alltid
  - b. Kun når jeg tror det er grunn til det ut fra kundens antatte helsetilstand
  - c. Kun ved visse naturmidler
  - d. Nei
28. Hvis du ikke svarer nei på spørsmål 27; sjekker du da for potensielle interaksjoner?

Hvilke kilder bruker du i så fall for dette?

29. Hvilke overordnet tiltak tror du kunne være egnet for å sikre personer med demens riktig bruk av legemidler? Ett eller flere svar er mulig, prioriter alternativene du velger.
- a. Informasjon fra helsemyndighetene til den generelle befolkning
  - b. Endringer i lovgivning og regulering av naturmidler?
  - c. Mer aktiv holdning hos fastlegen: spørre alle pasienter om bruk av naturmidler og sjekke etter bivirkninger og interaksjoner
  - d. Mer aktiv holdning hos hjemmetjenesten: videreformidle svaret til fastlege og/eller apotek
  - e. Mer aktiv holdning hos apotekansatte: sjekke etter interaksjoner hos alle som kjøper naturmidler, informere fastlegen
  - f. Dele ut naturmidler sammen med legemidler i multidose
30. Hva har vært de viktigste kildene til dine kunnskaper om naturmidler? Ett eller flere svar er mulig, prioriter alternativene du velger.
- a. Utdanning
  - b. Fagbøker, vitenskapelige artikler

- c. Internettider anerkjent av norske helsemyndigheter, farmasøytiske fagmiljø
  - d. Kurs om naturmidler
  - e. Media, ukeblad
  - f. Produktbrosjyrer
  - g. Fra familie og venner
31. Hvis du har deltatt på kurs om naturmidler: hvem arrangerte kurset? Var formålet med kurset mersalg?
32. Har ditt apotek tilgjengelig produktuavhengig informasjon for de ansatte om naturmidlene dere selger?
- a. Ja, for alle naturmidlene
  - b. For de fleste
  - c. For noen få
  - d. Nei
33. Fra hvilke kilder henter du vanligvis informasjon om naturmidler?
34. Er du enig i denne påstanden: "Bruk av naturmidler kan innebære en risiko for redusert helse"?
- a. Ja
  - b. Nei
  - c. Vet ikke
35. Hvilke(t) av følgende urteprodukter bør ikke tas av personer som tar Warfarin? Flere svaralternativ er mulig.
- a. Ginkgo biloba
  - b. Johannesurt
  - c. Salvia officinalis
  - d. Solhatt



## Appendix II Invitation and information letter

Kjære apotekansatt!

Vi kontakter deg vedrørende studien "Bruk av naturmidler hos personer med demens. Apotekansattes rolle". Denne spørreundersøkelsen er en del av Hilde Risvoll, NKS Kløveråsen Bodø, sitt doktorgradprosjekt og er Hamideh Movahedi, Institutt for farmasi, UiT, sin masteroppgave. Detaljert informasjon om prosjektet finner du i vedlegget til denne e-posten. Deltagelse i prosjektet er klarert med daglig leder ved ditt apotek og regionsleder for din apotekkjede.

Takk for at du vil delta i undersøkelsen!

Svar helst før 16. januar.

På forhånd tusen takk!

Delta ved å følge linken nedenfor:

<https://response.questback.com/universitetitroms/eixjiqtk8l/>

Med vennlig hilsen

Hilde Risvoll  
Spesialist i nevrologi  
NKS Kløveråsen

Hamideh Movahedi  
Farmasistudent  
Institutt for farmasi,UiT

### **Forespørsel om deltakelse i forskningsprosjektet**

#### ***"Bruk av alternativ behandling hos personer med demens. Apotekansattes rolle***

##### **Bakgrunn og hensikt**

Dette er et spørsmål til deg om å delta i en forskningsstudie for å kartlegge apotekansattes rolle som rådgiver for personer med demens, som bruker urtemedisin eller kost tilskudd heretter kalt naturmidler. Studien er en fortsettelse av en tidligere spørreundersøkelse utført ved NKS Kløveråsen as i samarbeid med RELIS Nord Norge og NAFKAM, UiT Norges arktiske universitet, hvor bruken av naturmidler hos personer med demens ble registrert. Det kom fram at nesten halvparten av pasientene brukte slike produkter og at de i liten grad fikk hjelp til å sikre rett bruk. Denne studien er ment som en kartlegging av ulike helsearbeidere/omsorgspersoners (fastleger, ansatte i hjemme-tjenesten, apotekansatte og pårørende) mulighet til å hjelpe personer med demens til forsvarlig bruk av legemidler/naturmidler. I denne studien vil alle

apotekansatte i Bodø, Fauske, Meløy, Mo i Rana, Saltdal, Vestvågøy og Vågan bli bedt om å svare på et spørreskjema vedrørende deres rolle som veileder i forhold til personer med demens bruk av naturmidler. Apotekansatte i Sortland og Narvik kan bli inkludert i studien hvis deltagelsen blir for lav i de øvrige kommunene. Undersøkelsen er et samarbeid mellom NKS Kløveråsen as (Hukommelsesklinikk), RELIS Nord Norge (Regionalt senter for produsentuavhengig legemiddelinformasjon) og NAFKAM (Nasjonalt forskningssenter innen komplementær og alternativ medisin), UiT Norges arktiske universitet. Institutt for farmasi, UiT Norges arktiske universitet er samarbeidspartner i studien. Siden bruken av naturmidler hos demente allerede er utbredt, er et langsiktig mål med studien er å utvikle et system for trygg bruk av naturmidler hos denne gruppen.

### **Hva innebærer studien?**

Deltagere vil få tilsendt et spørreskjema for utfylling. Utfyllingen er anonym. Ansvarlig for den praktiske gjennomføring av studien er masterstudent i farmasi Hamideh Movahedi, Universitetet i Tromsø og overlege Hilde Risvoll, NKS Kløveråsen.

### **Mulige fordeler og ulemper**

Ved å bli med i studien bidrar man til at det settes fokus på hvordan man kan hjelpe en sårbar pasientgruppe med å ha rett legemiddelhåndtering/ unngå uheldige samvirkninger mellom legemiddel og naturmidler. Utfyllingen vil ta ca. 10 minutter. Det er få ulemper knyttet til deltagelse.

### **Hva skjer med informasjonen om deg?**

Informasjonen som registreres om deg skal kun brukes for å kartlegge apotekansattes rolle i forhold til bruken av naturmidler hos personer med demenssykdom med hensikt å utvikle en prosedyre for å sikre trygg bruk.

Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres

### **Frivillig deltagelse**

Det er frivillig å delta i studien. Å sende inn utfylt skjema oppfattes som samtykke. Siden studien er anonym og du ikke kan identifiseres, kan du ikke trekke din deltagelse etter å ha sent inn skjema. Har du spørsmål til studien, kan du kontakte Hilde Risvoll 75551610 eller Hamideh Movahedi 46346798

- Kriterier for deltagelse: Alle apotekansatte som har kundekontakt i kommunene Bodø, Fauske, Meløy, Mo i Rana, Saltdal, Vestvågøy og Vågan. Apotekansatte i Narvik og Sortland kan også bli bedt om å delta.
- Tidsskjema – hva skjer og når skjer det? Hvis du deltar i studien, fyller du ut vedlagt elektronisk spørreskjema så snart du har anledning.
- Mulige fordeler: bidra til å utarbeide bedre rutiner for å bedre sikkerheten for personer med demens
- Mulige bivirkninger: Ikke aktuelt
- Mulige ubehag/ulemper: Det vil ta 5-10 minutter å fylle ut skjemaet
- Studiedeltakerens ansvar: Å fylle ut skjemaet etter beste evne
- At studiedeltakeren vil bli orientert så raskt som mulig dersom ny informasjon blir tilgjengelig som kan påvirke pasientens/forsøkspersonens/deltakerens villighet til å delta i studien: Ikke aktuelt

- At studiedeltakeren skal opplyses om mulige beslutninger/situasjoner som gjør at deres deltagelse i studien kan bli avsluttet tidligere enn planlagt: ikke aktuelt
- Eventuell kompensasjon til og dekning av utgifter for deltakere: Ikke aktuelt

### **Personvern**

Opplysninger som registreres om deg er svarene fra spørreskjemaet du fyller ut.

Andre forskerinstitusjoner har ikke tilgang til datamaterialet.

UiT Norges arktiske universitet ved direktør er databehandlingsansvarlig.

### **Rett til innsyn og sletting av opplysninger om deg og sletting av prøver**

Siden studien er anonym, kan ikke opplysningene om deg etterspores og heller ikke slettes.

### **Økonomi og eventuell sponsors rolle**

Studiens finansiering er ikke helt avklart. Det vil bli søkt om midler fra Helse Nord, Den norske legeforening, Extrastiftelsen og Odd Berg gruppen. Andre ideelle sponsorer kan bli spurt om støtte. NKS Kløveråsen as, RELIS og NAFKAM vil dekke aktuelle utgifter. Ingen kommersielle aktører bidrar i studien.

### **Forsikring**

Ikke aktuelt

**Informasjon om utfallet av studien** Studien vil bli publisert i et internasjonalt tidsskrift f.eks. Drugs and Aging og framlagt på en internasjonal konferanse. Studien kan etter ønske legges fram på Norges Farmasøytiske forening - Nordland krets årsmøte eller i andre yrkesrelevante fora. Informasjon vil gå til hvert deltagende apotek. Alle deltagere som ønsker informasjon om resultat direkte til seg f.eks. på mail, kan ta kontakt med Hilde Risvoll rih@kloverasen.no.