Clinical pain research

Lena Sandin Wranker*, Sölve Elmståhl and Henrik Ekström

Pain and alcohol: a comparison of two cohorts of 60 year old women and men: findings from the Good Aging in Skåne study

https://doi.org/10.1515/sjpain-2018-0064
Received April 2, 2018; revised June 6, 2018; accepted June 16, 2018; previously published online July 11, 2018

Abstract

Background and aims: Pain, use of painkillers and alcohol are highly prevalent in the general population. Aims of the study were to describe differences in pain, alcohol consumption and use of painkillers among two 60 year old birth cohorts stratified by gender.

Methods: Participants were recruited from the Skåne centre of The Swedish National study on Aging and Care, a multicentre, prospective, longitudinal study. The sample comprised 60 year old men and women born between 1941 and 1943 and recruited to the study between 2001 and 2004 ($n = 663$) and 60 year old men and women born in the period 1952–1954 and recruited to the study between 2013 and 2015 ($n = 924$). Specially trained research staff conducted the interviews. For descriptive statistics the variables were presented in total numbers, percentages, mean and standard deviation, and 1st and 3rd quartile are also shown. The sample was divided into four groups: men and women born in the period 1941–1943, men and women born in the period 1952–1954, respectively.

Results: No difference in alcohol intake was detected between the two birth cohorts. All participants, regardless of pain or not, reported alcohol use below the specified risk level for both sexes. Teetotallers were more common in the 1952–1954 male cohort, 128 (29%), $p < 0.029$. Two hundred and eighty one Men born between 1952 and 1954 reported pain (59.0%), compared to 173 men born between 1941 and 1943 (51.6%), $p < 0.034$. There was no difference between the male cohorts in use of painkillers, $p < 0.062$. No difference was found between the two female cohorts in terms of pain, $p < 0.144$. One hundred and ten women in the 1941–43 cohort used painkillers (53.1%) compared to 119 women born between 1952 and 1954 (40.1%), $p < 0.004$. When comparing men and women with pain born between 1941 and 1942, men with moderate pain use more alcohol, 157 g/month (q1 10, q3 365) than women, 44 g/month (q1 0, q3 134), $p < 0.001$. Men with severe pain also use more alcohol, 96 g/month (q1 17, q3 324) than women, 27 g/month (q1 0, q1 118), $p < 0.030$, and when those with pain were merged into a group, men use more alcohol, 175 g/month (q1 31, q3 356), than women, 68 g/month (q1 1, q3 207), $p < 0.001$. This also applies to the later cohort; men, 132 g/month (q1 22, q3 270), compared to women, 76 g/month (q1 8, q3 182), $p < 0.001$. When merging all pain into one group women use more painkillers both in the 1941–43 cohort, men (39.9%) compared to women (53.1%), $p < 0.010$ and in the 1952–54 cohort, men (18.5%) compared to women (26.6%), $p < 0.003$. Use of analgesics and alcohol is common but the highest percentage is among women born between 1941 and 1943, 45 (48.9%).

Conclusions: Pain and alcohol use are common among 60 year old women and men. A gender difference is that women use more painkillers. In the 1941–43 cohort almost every second woman with moderate pain who took painkillers also consumed alcohol.

Implications: It is time to alert prescribers that a large section of the population uses alcohol combined with painkillers. More research is needed to better understand the long-term perspective on health when using both painkillers and alcohol.

Keywords: pain; painkillers; alcohol; gender; cohorts; elderly adults.

***Corresponding author: Lena Sandin Wranker,** Department of Health Sciences, Division of Geriatric Medicine, Lund University, Lund, Sweden, E-mail: lena.sandin_wranker@med.lu.se
Sölve Elmståhl and Henrik Ekström: Department of Clinical Sciences, Division of Geriatric Medicine, Lund University, Lund, Sweden

1 Introduction

A striking conclusion of the World Health Organisation (WHO) is that the inhabitants of the European Region consume the most alcohol per capita in the world [1].

It is now widely known that alcohol interacts with medication and can lead to serious health problems. Merrick and colleagues found that nine percent of elderly individuals reported heavy drinking (i.e. more than 168 g alcohol/week for men and more than 108 g alcohol/week for women [2]) despite having a higher educational level and better health status than those who did not report excessive alcohol consumption [3].

New findings suggest that the recommended risk thresholds for alcohol consumption should be lowered as 100-g or more of alcohol per week may linearly lower life expectancy [4]. In most cases alcohol-related problems refer to those who are dependent on alcohol. Alcohol may cause problems among older individuals, regardless of how many grams they consume, because of their changed physiology and the interaction with painkillers [5].

Older adults change their drinking patterns in diverse ways after their health deteriorates [6]. As health, social and economic aspects affect older persons' drinking habits it is important to consider their whole situation when taking measures to reduce alcohol consumption [6], especially among those who use painkillers. All painkillers interact with alcohol, for example the level of glutathione decreases after ingestion of therapeutic doses of acetaminophen, which may increase the risk of hepatocellular necrosis [7].

It has previously been reported that more than 50% of the elderly population (60 years and older) have pain [8]. The use of prescription painkillers has been reported by almost 60% of women and nearly 50% of men aged 60 years and older [8]. This possible association between pain and alcohol is of increasing empirical interest because alcohol and analgesics often interact with each other and alcohol also has an analgesic effect. Pain at an older age entails an elevated risk of alcohol abuse [9]. Therefore, clinicians need to be observant of alcohol consumption among their pain patients – especially men [10].

A study of accidental mortality associated with acetaminophen and codeine use found that nearly 80% of these deaths involved another medication or alcohol [11]. It is also known that pain is common in individuals seeking help for alcohol addiction [12]. Gender differences were revealed in the study of drinking habits where daily alcohol intake in women was associated with better mental health, while men's daily drinking was associated with better physical health [13]. Patients treated with medical cannabis often use alcohol in a manner that poses a high risk [14]. Patients with mild to moderate pain are at higher risk of using alcohol in an unhealthy way compared to patients reporting severe pain [14]. Laboratory findings suggest that acute pain is related to intentions to drink but no relationship with the demand for alcohol was found [15]. Consequently, improving pain-coping skills may result in a decrease in coping-motivated drinking [15].

The aims of this study were to describe differences in pain, alcohol consumption and use of painkillers among two 60 year old birth cohorts stratified by gender.

2 Methods

2.1 Sample

The Swedish National study on Aging and Care (SNAC) is a multicentre, prospective, longitudinal study initiated by the government and the Ministry of Social affairs and includes randomly selected individuals aged 60–96 years. The present study was designed to compare cohorts of women and men aged 60 years at inclusion who answered the question about alcohol intake (B196). This is a random sample representing two different cohorts of the 60 year old population. The reason the youngest age group in the SNAC study was chosen is that it gives us a greater opportunity to follow these cohorts/participants over time and investigate whether pain, alcohol and the use of analgesics differ. More details about the structure of the SNAC study are provided elsewhere by Lagergren et al. [16].

Participants ($n = 2{,}457$) were recruited from the Good Aging in Skåne (GÅS) centre in the Southern part of Sweden, which includes five municipalities covering a middle-sized town, small towns and rural areas, between 2001 and 2004 ($n = 710$) and 2013–2015 ($n = 930$) to investigate possible changes over 12 years. The response rate was 66.7%. The 53 participants who did not indicate whether they suffered from pain during the previous month were excluded. The final sample consisted of 1,587 participants (64.6%), 335 (50.5%) men and 328 (49.5%) women in the 1941–42 cohort and 476 (51.5%) men and 448 (48.5%) women in the 1951–53 cohort. Missing data (n) from both inclusion dates are reported in the tables.

2.2 Procedure

Potential participants were invited by letter to take part in the study. If no answer was received after 2 weeks three attempts were made to contact them by phone. Medical examination and testing by research personnel (physicians and specially trained nurses) took place during the data collection period, which comprised the 6 weeks before and after their 60th birthday. Permission

to access medical records and informed consent were obtained from each participant, who completed a questionnaire in the period between the medical examination and the structured interviews. The study was conducted in accordance with the Declaration of Helsinki (WMA, 2013). The Ethics Committee of Lund University (LU 744-00) approved the GÅS study.

2.3 Measures

Socio-demographic data; age, gender, marital status, education, residential area and economic sufficiency were self-reported and collected from the questionnaire. Marital status was dichotomized into married/cohabitant or living alone (single/widowed/divorced), education was dichotomized into elementary/secondary school or university and type of residential area into rural/semi-urban/and urban. Economic sufficiency was answered by "yes" or "no" to the question about whether it had been difficult to make ends meet for living expenses in the past year.

Pain was self-reported and based on the question: "Have you had an ache/pain during the past 4 weeks?" The response alternatives were "yes" and "no".

Participants were asked to classify their pain during the past 4 weeks. The response alternatives were: "no pain", "little pain", "moderate pain", "severe pain" or "very severe pain", where severe and very severe pain were combined into one category "severe pain". Use of pain killers was captured by the question: "Do you get any treatment for the pain?" The response alternatives were: "no treatment", "medication (pain killers)", "other treatment, for example physiotherapy" and "both medication and other treatment". Participants who answered medication or medication and other treatment were categorized as users of pain killers.

Alcohol habits were assessed by the question "How often do you drink alcohol?" The response alternatives were "never", "once a month or less", "2–4 times a month", "2–3 times a week" and "4 times a week or more often".

Alcohol consumption was self-reported and the questions were as follows: "How many glasses do you drink on average when you drink alcohol?" The response alternatives were: "Do not drink alcohol", "1–2", "3–4", "5–6", "7–9" and "10 or more". Alcohol consumption was calculated based on the frequency and amount of beer, wine, or spirit consumption in the previous 4 weeks reported by the participants. The volume of alcohol for beer was set at 3.5% and for wine and spirits at 12% and 42%, respectively. The total volume of pure alcohol (ethanol, density of 0.789 g/mL) consumed was converted to grams. A standard glass was considered to contain 12 g. Risk drinking for women was defined as nine or more standard glasses/week (108 g) or four glasses (48 g) on one occasion. The corresponding amount for men was 14 standard glasses/week (168 g) or five glasses (60 g) on one occasion. Heavy drinking for women and men was defined as exceeding the above-mentioned risk-levels on a weekly basis or on a specific occasion [2].

2.4 Statistical analysis

The data were first stratified for gender and analyses comparing the two birth cohorts were performed separately for men and women. Sociodemographic characteristics, pain intensity, use of painkillers, alcohol habits and alcohol consumption are presented in numbers and percentages for each cohort. Differences between cohorts were tested by the chi-squared (χ^2) test (Tables 1 and 2).

For descriptive statistics the categorical variables are presented in totals, percentages, mean and standard deviation (Sd) with 1st and 3rd quartile as distribution measurements. The sample was divided into the following groups: (a) men born between 1941 and 1943 (b) women born between 1941 and 1943 (c) men born between 1952 and 1954 (d) women born between 1952 and 1954.

3 Results

Men in the two cohorts had a mean age of 60.3 years and a majority were married or cohabiting (79.4% and 75.8%). Men born between 1953 and 1954 more often lived in rural areas ($p < 0.004$), see Table 1.

Men in the 1941–43 cohort had a lower educational level (elementary school) $p < 0.007$. Men in the 1952–54 cohort reported pain more often, 281 (59.0%), than men born between 1941 and 1943, 173 (51.6%), $p < 0.034$. No difference in use of painkillers was found between men in the two cohorts, 69 (39.9%) vs. 88 (31.3%), $p < 0.062$. Teetotallers or those who seldom consumed alcohol were more common among men in the 1952–54 cohort, 128 (29.0%) vs. men born between 1941 and 1943, 92 (27.5%), $p < 0.029$. No difference in alcohol use was detected between the two male cohorts; 166 g/month (q1 36–q3 348) vs. 133 g/month (q1 26–q3 282), $p < 0.134$, even when divided into different pain groups, see Table 1.

Women in the two cohorts had a mean age of 60.3 and 60.2 (n.s.). A majority were married or cohabiting but women in the 1941–43 cohort more often reported being

Table 1: Description of the 60 year old male cohorts, born between 1941–1943 and 1952–1954.

Men, birth cohort	1941–1943 $n=335$	1952–1954 $n=476$	p-Value	Missing
Years of examination	2001–2004	2013–2015		
Age, mn (sd)	60.3 (0.39)	60.3 (0.48)		
Marital status				0/1
Married/cohabiting, *n* (%)	266 (79.4)	360 (75.8)	0.227	
Single/widowed/divorced, *n* (%)	69 (20.6)	115 (24.2)		
Education				0/36
Elementary school, *n* (%)	128 (38.2)	121 (27.5)	0.007	
Secondary school, *n* (%)	108 (32.2)	163 (37.0)		
≥1 year of university studies, *n* (%)	99 (29.6)	156 (35.5)		
Type of residential area				0/34
Rural, *n* (%)	15 (4.5)	43 (9.7)	0.004	
Semi urban, *n* (%)	67 (20.0)	107 (24.2)		
Urban, *n* (%)	253 (75.5)	292 (66.1)		
Economic sufficiency (yes), *n* (%)	321 (93.1)	409 (92.7)	0.834	0/35
Pain past month				0/0
No pain, *n* (%)	162 (48.4)	195 (41.0)	0.034	
Little pain, *n* (%)	87 (26.0)	167 (35.1)		
Moderate pain, *n* (%)	68 (20.3)	84 (17.6)		
Severe pain, *n* (%)	18 (5.4)	30 (6.3)		
Pain past month, use of painkillers, *n* (%)	69 (39.9)	88 (31.3)	0.062	0/0
Alcohol habits previous month				0/34
Never/at most once a month, *n* (%)	92 (27.5)	128 (29.0)	0.029	
2–4 times a month, *n* (%)	124 (37.0)	173 (39.1)		
2–3 times a week, *n* (%)	76 (22.7)	112 (25.3)		
≥4 times a week, *n* (%)	43 (12.8)	29 (6.6)		
Alcohol, grams previous month, md (q1, q3)	166 (36, 348)	133 (26, 282)	0.134	0/29
Pain/alcohol in grams previous month				0/29
No pain, md (q1, q3)	160 (38, 330) $n=162$	137 (34, 285) $n=185$	0.492	
Little pain, md (q1, q3)	178 (45, 348) $n=87$	147 (45, 285) $n=158$	0.315	
Moderate pain, md (q1, q3)	157 (10, 365) $n=68$	107 (11, 300) $n=75$	0.574	
Severe pain, md (q1, q3)	96 (17, 324) $n=18$	78 (0, 190) $n=29$	0.166	
Pain all, md (q1, q3)	175 (31, 356) $n=173$	132 (22, 270) $n=262$	0.165	

single/widowed/divorced, 123 (37.5%) vs. 126 (28.1%), $p<0.006$. Women in the 1952–54 cohort more often lived in rural areas, 27 (6.6%) than women in the 1941–43 cohort, 16 (4.9%), $p<0.001$, see Table 2.

Women in the 1941–43 cohort more commonly had a lower educational level (elementary school) 122 (37.3%) vs. 87 (21%), $p<0.001$, but no difference was found between the cohorts in terms of pain, regardless of intensity, $p<0.144$. Women in the 1941–43 cohort more often used painkillers, 110 (53.1%) vs. women born in the 1952–54 cohort 119 (40.1%), $p<0.004$. Teetotallers or those who seldom used alcohol were about the same in the two female cohorts, 138 (42.2%) vs. 158 (38.1%), $p<0.662$. No difference in alcohol use was detected between the two female cohorts, 81 g/month (q1 11–q3 227) vs. 76 g/month (q1 8–q3 182), $p<0.225$, even when divided into different pain groups, see Table 2.

The percentage of men with severe pain who used painkillers was 61.1% for the 1941–43 cohort and 73.3% for the 1952–54 cohort but with no difference between the cohorts ($p<0.376$). It was also common for men with severe pain to combine painkillers and alcohol, as this applied to eight men in the 1941–43 cohort (44.4%) vs. 13 men in the 1952–54 cohort (44.8%), with no difference between cohorts ($p<0.980$), see Table 3.

When comparing the two female cohorts, it was found that the use of painkillers is more common among women in the 1941–43 cohort, 110 (53.1%) vs. 119 (40.1%), $p<0.004$, who more often reported alcohol consumption than women in the 1952–54 cohort, 80 (38.8%) vs. 82 (28.9%) $p<0.021$. The combination of painkillers and alcohol is most frequently reported by women with moderate pain: Women in the 1941–43 cohort, 45 (48.9%) vs. women in the 1952–54 cohort, 44 (39.3%), but without a significant difference between the cohorts, $p<0.202$, see Table 4.

When comparing men and women with pain in the 1941–42 cohort, men with moderate pain use more alcohol

Table 2: Description of the 60 year old female cohorts, born between 1941–1943 and 1952–1954.

Women, birth cohort	1941–1943 *n* = 328	1952–1954 *n* = 448	*p*-Value	Missing
Years of examination	2001–2004	2013–2015		
Age, mn (sd)	60.3 (0.40)	60.2 (0.40)		
Marital status				0/0
Married/cohabiting, *n* (%)	205 (62.5)	322 (71.9)		
Single/widowed/divorced, *n* (%)	123 (37.5)	126 (28.1)	0.006	
Education				0/34
Elementary school, *n* (%)	122 (37.3)	87 (21.0)	0.001	
Secondary school/University, *n* (%)	105 (32.1)	159 (38.3)		
≥1 year of university studies, *n* (%)	100 (30.6)	169 (40.7)		
Type of residential area				0/33
Rural, *n* (%)	16 (4.9)	27 (6.5)	0.001	
Semi urban, *n* (%)	46 (14.0)	99 (23.9)		
Urban, *n* (%)	266 (81.1)	289 (69.6)		
Economic sufficiency (yes), *n* (%)	304 (92.7)	385 (92.8)	0.963	0/33
Pain previous month, % (n)				0/0
No pain, *n* (%)	121 (36.9)	151 (33.7)	0.144	
Little pain, *n* (%)	82 (25.0)	145 (32.4)		
Moderate pain, *n* (%)	92 (28.0)	117 (26.1)		
Severe pain, *n* (%)	33 (10.1)	35 (7.8)		
Pain previous month, use of painkillers *n* (%)	110 (53.1)	119 (40.1)	0.004	0/0
Alcohol habits, intake past year				1/33
Never/At most once a month, *n* (%)	138 (42.2)	158 (38.1)	0.662	
2–4 times a month, *n* (%)	108 (33.0)	153 (36.9)		
2–3 times a week, *n* (%)	59 (18.0)	77 (18.6)		
≥4 times a week, *n* (%)	22 (6.7)	27 (6.5)		
Alcohol grams previous month, md (q1, q3)	81 (11, 227)	76 (8, 182)	0.225	1/25
Pain/alcohol in grams previous month				1/25
No pain	114 (29, 286) *n* = 121	76 (9, 188) *n* = 139	0.042	
Little pain	114 (45, 255) *n* = 81	96 (23, 217) *n* = 138	0.163	
Moderate pain	44 (0, 134) *n* = 92	70 (0, 181) *n* = 112	0.232	
Severe pain	27 (0, 118) *n* = 33	10 (0, 78) *n* = 34	0.395	
Pain all	68 (1, 207) *n* = 206	76 (3, 182) *n* = 284	9.919	

Table 3: Comparison of the use of painkillers and alcohol intake in the previous month between men in the two 60 year old birth cohorts broken down by pain level.

Men, birth cohort	1941–1943 *n* = 173[a]	1952–1954 *n* = 281[a]	*p*-Value	1941–1943 *n* = 173[a]	1952–1954 *n* = 281[a]	*p*-Value	1941–1943 *n* = 173[a]	1952–1954 *n* = 281[a]	*p*-Value
Pain previous month	Use of painkillers[b]			Use of painkillers/alcohol[b,c]			Use of painkillers/alcohol (g)[c]		
	n (%)	*n* (%)		*n* (%)	*n* (%)		md (q1, q3)	md (q1, q3)	
Little pain	24 (27.6)	33 (19.8)	0.156	17 (19.5)	27 (17.1)	0.635	178 (59, 280) *n* = 17	210 (99, 480) *n* = 27	0.353
Moderate pain	34 (50.0)	33 (39.3)	0.186	23 (33.8)	25 (33.3)	0.951	190 (107, 355) *n* = 23	234 (89, 365) *n* = 25	0.926
Severe pain	11 (61.1)	22 (73.3)	0.376	8 (44.4)	13 (44.8)	0.980	207 (94, 407) *n* = 8	137 (80, 312) *n* = 13	0.595
Pain all	69 (39.9)	88 (31.3)	0.062	48 (27.7)	65 (24.8)	0.494	190 (94, 345) *n* = 48	210 (89, 365) *n* = 65	0.774

[a]Participants suffering from pain. [b]Totals and percentages in each pain category. [c]Non-consumers of alcohol/teetotallers not included. Birth cohort 1941–1943 examined 2001–2004 and birth cohort 1952–1954 examined 2013–2015.

than women, 157 g/month (q1 10–q3 365) compared to 44 g/month (q1 0–q3 134), $p < 0.001$. Men with severe pain also use more alcohol, 96 g/month (q1 17–q3 324) than women, 27 g/month (q1 0–q3 118), $p < 0.030$ and when those with pain are merged, the men use more alcohol 175 g/month (q1–31–q3 356) than the women 68 g/month (q1 1–q3 207), $p < 0.001$, see Table 5.

When comparing men and women in the 1952–54 cohort, men with no pain use more alcohol than women 137 g/month (q1 34–q3 285) compared to 76 g/month (q1

Table 4: Comparison of alcohol intake and use of painkillers in the previous month between women in the two 60 year old birth cohorts broken down by pain level.

Women, birth cohort	1941–1943 $n=207$[a]	1952–54 $n=297$[a]	*p*-Value	1941–1943 $n=207$[a]	1952–1954 $n=297$[a]	*p*-Value	1941–1943 $n=207$[a]	1952–1954 $n=297$[a]	*p*-Value
Pain previous month	Use of painkillers[b]			Use of painkillers/alcohol[b,c]			Use of painkillers/alcohol (g)[c]		
	n (%)	*n* (%)		*n* (%)	*n* (%)		md (q1, q3)	md (q1, q3)	
Little pain	26 (31.7)	34 (23.4)	0.175	22 (27.2)	25 (18.1)	0.116	212 (58, 311) $n=22$	118 (80, 250) $n=25$	0.455
Moderate pain	60 (65.2)	50 (51.3)	0.043	45 (48.9)	44 (39.3)	0.202	114 (44, 227) $n=45$	116 (45, 216) $n=44$	0.688
Severe pain	24 (72.7)	25 (71.4)	0.905	13 (39.4)	13 (38.2)	1.00	91 (17, 176) $n=13$	76 (46, 179) $n=13$	0.817
Pain all	110 (53.1)	119 (40.1)	0.004	80 (38.8)	82 (28.9)	0.021	113 (48, 228) $n=80$	113 (47, 212) $n=82$	0.804

[a]Participants suffering from pain, [b]totals, percentages in each pain category, [c]non-consumers of alcohol/teetotallers not included. Birth cohort 1941–1943 examined 2001–2004 and birth cohort 1952–1954 examined 2013–2015.

Table 5: Comparison between men and women in each birth cohort regarding alcohol consumption, use of painkillers, use of painkillers in combination with alcohol and use of painkillers and intake of alcohol in grams in the previous month, broken down by pain level.

Birth cohort	1941–1943		*p*-Value	1952–1954		*p*-Value
	Men $n=335$	Women $n=328$		Men $n=476$	Women $n=448$	
Alcohol (g)						
No pain	160 (38, 330) $n=162$	114 (29, 286) $n=121$	0.235	137 (34, 285) $n=185$	76 (9, 188) $n=139$	0.005
Little pain	178 (45, 348) $n=87$	114 (45, 255) $n=81$	0.218	147 (45, 285) $n=158$	96 (23, 217) $n=138$	0.025
Moderate pain	157 (10, 365) $n=68$	44 (0, 134) $n=92$	<0.001	107 (11, 300) $n=75$	70 (0, 181) $n=112$	0.024
Severe pain	96 (17, 324) $n=18$	27 (0, 118) $n=33$	0.030	78 (0, 190) $n=29$	10 (0, 78) $n=34$	0.175
Pain all	175 (31, 356) $n=173$	68 (1, 207) $n=206$	<0.001	132 (22, 270) $n=262$	76 (8, 182) $n=284$	0.001
Use of painkillers						
Little pain	24 (27.6)	26 (31.7)	0.557	33 (19.8)	34 (23.4)	0.429
Moderate pain	34 (50.0)	60 (65.2)	0.053	33 (39.3)	60 (51.3)	0.092
Severe pain	11 (61.6)	24 (72.7)	0.393	22 (73.3)	25 (71.4)	0.864
Pain all	69 (39.9)	110 (53.1)	0.010	88 (18.5)	119 (26.6)	0.003
Painkillers/alcohol[a]						
Little pain	17 (19.5)	22 (26.8)	0.261	27 (16.2)	25 (17.2)	0.800
Moderate pain	23 (33.8)	45 (48.9)	0.560	25 (29.8)	44 (37.6)	0.248
Severe pain	8 (44.4)	13 (39.4)	0.726	13 (43.3)	13 (37.1)	0.612
Pain all	48 (27.7)	80 (38.6)	0.025	65 (13.7)	82 (18.3)	0.217
Painkillers/alcohol (g)						
Little pain	178 (59, 280) $n=17$	212 (58, 311) $n=22$	0.705	210 (99, 480) $n=27$	118 (80, 250) $n=25$	0.167
Moderate pain	190 (107, 355) $n=23$	114 (44, 227) $n=45$	0.010	234 (89, 365) $n=25$	116 (45, 216) $n=44$	0.021
Severe pain	207 (94, 407) $n=8$	91 (17, 176) $n=13$	0.045	137 (80, 312) $n=13$	76 (46, 179) $n=13$	0.228
Pain all	190 (94, 345) $n=48$	113 (48, 228) $n=80$	0.008	210 (89, 365) $n=65$	113 (47, 212) $n=82$	0.005

[a]Totals, percentages in each pain category.

9–q3 188), $p<0.005$, men with little pain, 147 g/month (q1 45–q3 285), women with little pain 96 g/month (q1 23–q3 2017), $p<0.025$, men with moderate pain, 107 g/month (q1 11–q3 300), women with moderate pain 70 g/month (q1 0–q3 181), $p<0.024$, and when all individuals with pain are merged in one group, men 132 g/month (q1 22–q3 270), women 76 g/month (q1 8–q3 182), $p<0.001$. The only exception is the group reporting severe pain where no gender difference could be detected, $p<0.175$, which differs from men and women in the 1941–43 cohort, where men reporting severe pain use more alcohol, 207 g/month (q1 94–q3 407) than women 91 g/month (q1 17–q3 176), $p<0.045$, see Table 5.

When all reported pain was merged into one group a significant gender difference was found where women used more painkillers. In the 1941–43 cohorts 69 men reported using painkillers (39.9%) compared to 110 women (53.1%), $p<0.010$, while in the 1952–54 cohorts 88 men reported using painkillers (18.5%) compared to 119 women (26.6%), $p<0.003$. A gender difference was found when

comparing different pain groups and use of painkillers and alcohol. In the 1941–43 cohort women used the combination more often (80, 38.6%) than men (48, 27.7%), $p < 0.025$. However, when all pain was merged into one group and alcohol reported in g, a significant gender difference was found between both cohorts. In the 1941–43 cohort men reported 190 g/month (q1 94–q3 345) vs. women 113 g/month (q1 48–q3 228), $p < 0.008$, while in the 1952–53 cohort men reported consuming 210 g/month (q1 89–q3 365) vs. women 113 (q1 47–q3 2012, $p < 0.005$), see Table 5.

It no longer applies that those experiencing pain are more restrained with alcohol than individuals without pain except for women with pain in the 1941–43 cohort who used significantly less alcohol than women without pain; men with pain in the 1941–43 cohort 175 g/month (q1 31–q3 356) vs. those without pain 160 g/month (q1 38–q3 330), $p < 0.798$; men with pain in the 1952–54 cohort 132 g/month (q1 22–q3 270) vs. without pain 137 g/month (q1 34–q3 285), $p < 0.610$; Women with pain in the 1941–43 cohort 68 g/month (q1 1–q3 207) vs. those without pain 114 g/month (q1 29–q3 286), $p < 0.008$; and women with pain in the 1952–54 cohort 76 g/month (q1 3–q3 182) vs. those without pain 76 g/month (q1 9–q3 188), $p < 0.630$.

Among men in the 1941–43 cohort, eight (44%) with severe pain reported that they used both alcohol and painkillers. This 44% used alcohol to a higher extent than other men reporting pain in this cohort and both the mean and quartiles are elevated; 207 g/month (q1 94–q3 407), but without a corresponding increase in alcohol intake in women with severe pain 91 g/month (q1 17–q3 176), $p < 0.045$.

4 Discussion

This study compares cohorts of the same age (60 years) at a 12 year interval to investigate whether alcohol habits changed over time, especially in the section of the population that has pain and uses pain medication. No difference in drinking behavior between the two male cohorts was found, except that men in the 1953–54 cohort were more often teetotallers. The two female cohorts showed no difference in alcohol intake. There was no increase in the number of teetotallers or those who rarely used alcohol among women in the 1953–54 cohort, which is in line with previous research showing that the number of female teetotallers in Sweden decreased between 1997 and 2001 [17].

Men with severe pain seem to use less alcohol than those reporting little or moderate pain, which is in line with findings among the women and corresponds well with previous research [14]. The women in the 1941–43 cohort use painkillers and alcohol to a higher extent than those in the 1953–54 cohort. This should underline the need for a new approach where older women with pain receive the greatest attention in discussions about alcohol, especially when prescribing pain medication, which is in contrast to previous research where the main focus was on men's alcohol habits [10]. Although there are gender differences in the amount of reported alcohol consumption in the two cohorts, both men and women with pain who use analgesics indicate a mean alcohol intake that is well below the stated risk level. However, the combination of analgesics and alcohol makes them a potential risk group. Alcohol consumption has been stated in grams, but consideration should be given to the fact that women usually weigh significantly less than men and thus may be at the same or perhaps even greater risk than men from the reported alcohol intake. The present findings show no difference in alcohol use among individuals with or without pain except for women in the 1941–43 cohort, thus contradicting previous research revealing that pain patients drank alcohol both in smaller quantities and more rarely compared to healthy controls [18]. A possible explanation for the differences is that the study by Thelin Bronner et al. was performed on a sample from a pain clinic. The present study investigates alcohol habits in two cohorts of 60 year old women and men from the general population with focus on those suffering from pain and using analgesics. The average alcohol consumption is estimated to be below the risk limit in both cohorts regardless of gender, which may be due to an underestimation of the amount of alcohol consumed as the results are not consistent with previous surveys of alcohol consumption [3]. Men with severe pain who use painkillers in the 1941–43 cohort report the highest alcohol intake, where the third quartile indicates that although some individuals have a high alcohol consumption, they are still below the risk limit.

Men consume more alcohol and have long been regarded as the major risk group for mixing alcohol and analgesics. While we must continue to ensure that men reduce their alcohol intake, the comparison between these cohorts indicates a hopeful new trend that future generations of men are becoming more cautious about alcohol as more men in 1953–54 cohort are teetotallers or rarely consume alcohol.

Some limitations must be mentioned. A previous study has shown that alcohol consumption may vary according to the measure used among individuals with depression who reported heavy episodic drinking [19]. In the present study, alcohol consumption is given in grams consumed without knowledge of whether it concerns daily intake or only alcohol consumed on special occasions. To clarify the differences in consumption within the groups the first and

third quartiles have been indicated in the tables. Some of the groups are very small and therefore the results should be interpreted with caution. The results nevertheless indicate alcohol use in society and to the best of our knowledge, this is the first study in which cohorts of the same age have been compared gender wise in a 12 year follow-up with focus on pain, analgesics and alcohol use. Alcohol consumption is also self-reported, which may mean that the actual consumption is higher. This is substantiated by previous research [3] showing that 9% consume alcohol in excess of the risk limit, which differs from the present findings. Perhaps a computer-based application might improve reporting in the future [20], although the data will still be self-reported despite being collected electronically. The investigations were conducted at 12 year intervals, which in some cases means that the research staff were changed but special training was provided to minimize sources of error. The interval between the investigations also gives rise to some potential confounding variables as the cohorts differ regarding educational level, residential area and marital status. However, the strength of the study is the large number of individuals from two different cohorts randomized from a general population and that a test-retest has been conducted for the questions about alcohol, pain and use of painkillers.

Pain and alcohol use are both highly prevalent in the general population and the pain-alcohol relationship is of increasing empirical interest, particularly for clinicians prescribing painkillers, as the combination could be dangerous, especially in combination with older age where liver and kidney function are decline. Most of the disability-adjusted life years in the Nordic countries between 1990 and 2013 were due to premature mortality caused by alcohol [21]. Research has shown similar patterns in Scotland during the late nineties and early 2000s, where alcohol-related mortality in the 40–70 year age group increased markedly [22]. Drinking habits can be influenced by poor health [6]. There is still very little evidence that the measures taken in various countries have had an impact on alcohol consumption [23]. Selective alcohol prevention programmes report successful outcomes among specific groups [24], so reaching the risk groups, especially those on painkillers, with tailor-made interventions should be highly prioritized.

The issue of pain medication needs to be highlighted. It is obviously problematic that so many women and men consume alcohol in combination with analgesic drug therapy. Cannabinoids have become an increasingly common drug in pain management (both neuropathic and non-cancer pain) and are often combined with opioids. While the patients who try cannabis are mainly younger, about every sixth pain patient has tried it [25]. Combination treatments with several analgesics and alcohol are becoming more common, even though we do not know how they affect the individual in the long term. An equally big problem is that many men are not adequately treated for their pain or associated problems, which in many cases involve disturbed sleep [26]. Previous studies have shown that pain greatly reduces women's quality of life [26]. Among men, sleep problems cause the lowest quality of life [26]. This may partly explain the high alcohol consumption of both men and women who report pain. When treating the elderly with pain it is important that not only the pain and medication is investigated and validated but also sleep and alcohol habits. A holistic approach is desirable.

It is thus high time to create a model for a lasting reduction of alcohol intake in the population. New findings show that the recommendations for risk consumption of alcohol should be reduced as it shortens life expectancy [4]. Better pain management strategies can reduce the desire to drink, but a lifestyle change strategy that can be implemented at health centres is important. A problem with the evaluation is that alcohol consumption is necessarily self-reported and therefore the amount can be inaccurate, but long-term follow-up with the registration of alcohol-related injuries and hospitalizations can be a possible way to evaluate efforts to influence lifestyle and alcohol consumption patterns. Perhaps the answers would be more reliable with computer-based applications because, according to the authors, it is possible to circumvent cultural taboos around alcohol by employing this model [20].

5 Conclusions

This study highlights the fact that many pain patients; men with severe pain born between 1941 and 1943 (44.4%); men with severe pain born between 1952 and 1954 (43.3%); women with moderate pain born between 1941 and 1943 (48.9%); women with moderate pain born between 1952 and 1954 (37.6%), use alcohol in combination with analgesics.

6 Implication

It is time to alert prescribers on the risk behavior of a large section of the population. This increased awareness also necessitates some form of action. It is important that the elderly obtain optimal pain relief, but it is equally vital

to reduce alcohol consumption among older individuals who also use analgesics [4, 5]. More research is needed to better understand the implications of using both painkillers and alcohol in the long-term and to find strategies to reduce drinking.

Authors' Statements

Research Funding: The Swedish National study on Aging and Care (SNAC) is a multicentre, prospective, longitudinal study, initiated and financially supported by the government and the Ministry of Social affairs.

Conflict of Interest: The authors declare that there are no conflicts of interest.

Informed Consent: Access to medical record and informed consent were obtained from each patient.

Ethical approval: The study was conducted in accordance with the Declaration of Helsinki (WMA, 2013). The ethics committee of Lund University (LU 744-00) has approved the GÅS study.

References

[1] WHO. Regional office for Europe. Status Report on Alcohol and Health in 35 European Countries, 2013. ISBN 978 92 890 00086. http://www.euro.who.int/__data/assets/pdf_file/0017/190430/Status-Report-on-Alcohol-and-Health-in-35-European-Countries.pdf assessed 28112017.

[2] Laatikainen T, Manninen L, Poikolainen K, Vartiainen E. Increased mortality related to heavy alcohol intake pattern. J Epidemiol Community Health 2003;57:379–84.

[3] Merrick EL, Horgan CM, Hodgkin D, Garnick DW, Houghton SF, Panas L, Saitz R, Blow FC. Unhealthy drinking patterns in older adults: prevalence and associated characteristics. J Am Geriatr Soc 2008;56:214–23.

[4] Wood AM, Kaptoge S, Butterworth AS, Willeit P, Warnakula S, Bolton T, Paige E, Paul DS, Sweeting M, Burgess S, Bell S, Astle W, Stevens D, Koulman A, Selmer RM, Verschuren WMM, Sato S, Njølstad I, Woodward M, Salomaa V, et al. Risk thresholds for alcohol consumption: combined analysis of individual-participant data for 599 912 current drinkers in 83 prospective studies. Lancet 2018;391:1513–23.

[5] Moore AA, Morton SC, Beck JC, Hays RD, Oishi SM, Partridge JM, Genovese BJ, Fink A. A new paradigm for alcohol use in older persons. Med Care 1999;37:165–79.

[6] Gavens L, Goyder E, Hock ES, Harris J, Meier PS. Alcohol consumption after health deterioration in older adults: a mixed-methods study. Public Health 2016;139:79–87.

[7] Lauterburg BH, Velez ME. Liver and biliary Glutathione deficiency in alcoholics: risk factor for paracetamol hepatotoxicity. Gut 1988;29:1153–7.

[8] Wranker LS, Rennemark M, Berglund J. Pain among older adults from a gender perspective: findings from the Swedish National Study on Aging and Care (SNAC-Blekinge). Scand J Public Health 2016;4:258–63.

[9] Brennan PL, SooHoo S. Pain and use of alcohol in later life: prospective evidence from the health and retirement study. J Aging Health 2013;25:656–77.

[10] Brennan PL, Schutte KK, SooHoo S, Moos RH. Painful medical conditions and alcohol use: a prospective study among older adults. Pain Med 2011;12:1049–59.

[11] Hopkins RE, Dobbin M, Pilgrim JL. Unintentional mortality associated with paracetamol and codeine preparations, with and without doxylamine, in Australia. Forensic Sci Int 2018;282:122–26.

[12] Jakubczyk A, Ilgen MA, Bohnert ASB, Kopera M, Krasowska A, Klimkiewicz A, Blow FC, Brower KJ, Wojnar M. Physical pain in alcohol-dependent patients entering treatment in Poland – prevalence and correlates. J Stud Alcohol Drugs 2015;76:607–14.

[13] Stranges S, Notaro J, Freudenheim JL, Calogero RM, Muti P, Farinaro E, Russell M, Nochajski TH, Trevisan M. Alcohol drinking pattern and subjective health in a population-based study. Addiction 2006;101:1265–76.

[14] Davis AK, Walton MA, Bohnert KM, Bourque C, Ilgen MA. Factors associated with alcohol consumption among medical cannabis patients with chronic pain. Addict Behav 2018;77:166–71.

[15] Moskal D, Maisto SA, De Vita M, Ditre JW. Effects of experimental pain induction on alcohol urge, intention to consume alcohol, and alcohol demand. Exp Clin Psychopharmacol 2018;26:65–76.

[16] Lagergren M, Fratiglioni L, Hallberg IR, Berglund J, Elmstahl S, Hagberg B. Holst G, Rennemark M, Sjolund BM, Thorslund M, Wiberg I, Winblad B, Wimo A. A longitudinal study integrating population, care and social services data. The Swedish National study on Aging and Care (SNAC). Aging Clin Exp Res 2004;16:158–68.

[17] Bergman H, Källmén H. Swedish women have developed more risky and more harmful alcohol drinking habits. A survey of alcohol drinking changes among Swedes between 1997–2001. Lakartidningen 2003;100:1028–30, 1033–5. [Article in Swedish].

[18] Thelin Bronner KB, Wennberg P, Källmén H, Schult ML. Alcohol habits in patients with long-term musculoskeletal pain: comparison with a matched control group from the general population. Int J Rehabil Res 2012;35:130–7.

[19] Graham K, Massak A, Demers A, Rehm J. Does the association between alcohol consumption and depression depend on how they are measured? Alcohol Clin Exp Res 2007;31:78–88.

[20] Lee KSK, Wilson S, Perry J, Room R, Callinan S, Assan R, Hayman N, Chikritzhs T, Gray D, Wilkes E, Jack P, Conigrave KM. Developing a tablet computer-based application ('App') to measure self-reported alcohol consumption in Indigenous Australians. BMC Med Inform Decis Mak 2018;18:8.

[21] Agardh EE, Danielsson AK, Ramstedt M, Ledgaard Holm A, Diderichsen F, Juel K, Vollset SE, Knudsen AK, Minet Kinge J, White R, Skirbekk V, Mäkelä P, Forouzanfar MH, Coates MM, Casey DC, Naghavi M, Allebeck P. Alcohol-attributed disease burden in four Nordic countries: a comparison using the Global Burden of Disease, Injuries and Risk Factors 2013 study. Addiction 2016;111:1806–13.

[22] McCartney G, Bouttell J, Craig N, Craig P, Graham L, Lakha F, Lewsey J, McAdams R, MacPherson M, Minton J, Parkinson J, Robinson M, Shipton D, Taulbut M, Walsh D, Beeston C.

Explaining trends in alcohol-related harms in Scotland, 1991–2011 (I): the role of incomes, effects of socio-economic and political adversity and demographic change. Public Health 2016;132:13–23.
[23] Shakeshaft A, Doran C, Petrie D, Breen C, Havard A, Abudeen A, Harwood E, Clifford A, D'Este C, Gilmour S, Sanson-Fisher R. The effectiveness of community action in reducing risky alcohol consumption and harm: a cluster randomised controlled trial. PLoS Med 2014;11:e1001617.
[24] Lammers J, Goossens F, Conrod P, Engels R, Wiers RW, Kleinjan M. Effectiveness of a selective alcohol prevention program targeting personality risk factors: Results of interaction analyses. Addict Behav 2017;71:82–8.
[25] Degenhardt L, Lintzeris N, Campbell G, Bruno R, Cohen M, Farrell M, Hall WD. Experience of adjunctive cannabis use for chronic non-cancer pain: findings from the Pain and Opioids IN Treatment (POINT) study. Drug Alcohol Depend. 2015;147:144–50.
[26] Wranker L, Rennemark M, Berglund J, Elmståhl S. Relationship between pain and Quality of Life – findings from the Swedish National Study on Aging and Care – Blekinge study. Scand J Pain 2014;5:270–5.