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Bornhauser, Cornelia Brigitta

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Bornhauser C.[a], Quack Lötscher Katharina C.[a], Seifert B.[b], Simões-Wüst A.P.[a]

[a] Department of Obstetrics, University Hospital Zurich, Switzerland
[b] Department of Biostatistics, Epidemiology, Biostatistics and Prevention Institute, University Zurich, Switzerland

Correspondence:
Ana Paula Simões-Wüst, PD, PhD, University Hospital of Zurich, Department of Obstetrics, Schmelzbergstrasse 12 / PF 125, Path G 51a, CH-8091 Zurich, Switzerland, ana-paula.simoes-wuest[a]usz.ch

Summary

OBJECTIVE: The aim of this work was to gain knowledge on the health status of pregnant women in Switzerland, especially their attitude to and decisions about diet, use of medication and consumption of drugs, including alcohol and tobacco.

METHODS: Data collected by the consecutive Swiss Health Surveys of 2007 and 2012 on sociodemographic and lifestyle characteristics (including nutrition), type and intake of medication, use of alcohol, tobacco and illicit drugs of the female population were analysed. To compare pregnant with non-pregnant women, a group of 10 times as many non-pregnant women (reference group, n = 3090) was matched with all the participating women who said they were pregnant at the time of the survey (pregnant group, n = 309). The two groups were then compared.

RESULTS: The pregnant and non-pregnant participant groups were comparable with respect to most sociodemographic characteristics and both showed a high awareness of health-related issues. Significantly more pregnant than non-pregnant women revealed a high nutritional awareness, claiming to pay attention to what they ate (78.3 vs 73.0%). Frequent consumption of milk products and fish, and moderate consumption of meat were found more often in the pregnant group. Use of medication was comparable between the two groups, except that pregnant women took pain killers less frequently than did non-pregnant women (30.0 vs 61.5%) and relied more often on prescribed medication. Pregnant women were more restrictive in their alcohol consumption than non-pregnant women. Nevertheless, 10.0 and 1.9% of the pregnant women declared consumption of wine and beer, respectively, in the previous 7 days. Regular smoking was less frequent in the pregnant group than in the reference group (11.7 vs 30.3%) and less intensive (pregnant smokers smoked 3.6 cigarettes fewer per day). A few pregnant women (1.9%) said they consumed marijuana; no other illicit drugs were mentioned.

CONCLUSIONS: In Switzerland, women of child-bearing age revealed high general health-awareness. During pregnancy, a considerable proportion of the women adapted their diet and seemed to refrain from using pain killers and from consuming alcohol, tobacco and illicit drugs. However, since a fairly large minority of the pregnant women mentioned drinking alcohol and/or smoking tobacco, further preventive work is needed.

Keywords: pregnancy, nutrition, medication, drugs, behaviour, Switzerland, Swiss Health Survey

Introduction

Nutrition habits, use of medication and consumption of drugs during pregnancy have lasting effects on the development of the embryo/fetus [1]. To improve the health of future generations, pregnant women should be aware of these lasting effects and receive adequate support to better deal with the new responsibility for their unborn child. Surveys from various western countries show that, although most women adapt their lifestyle during pregnancy in an effort to improve their health status and that of their unborn children, a considerable proportion still exhibit risky behaviours (for example, see [2–5]). We wanted to characterise the lifestyle of pregnant women in Switzerland with respect to nutrition habits, use of medication and consumption of drugs.

In Switzerland, several organisations have engaged in helping women to cope with the challenges posed by pregnancy. The (medical) Swiss Society of Gynaecology and Obstetrics published recommendations for preconception counselling in 2010. According to these recommendations, women who want to get pregnant should receive information about healthy nutrition, be encouraged to normalise their weight, be instructed to replace possibly teratogen medication with less hazardous alternatives, and stop using alcohol, tobacco and illicit drugs [6]. It is, however, unclear what proportion of women visit preconception counselling before getting pregnant. After conception, at the first pregnancy visit to the obstetric provider, a general anamnesis is recorded, and topics such as nutrition (including supplementation), medications and hygiene should be

covered. An official brochure edited by the Swiss Public Health Office on nutritional information during pregnancy is available, but, to our knowledge, no official brochures about use of medication and substance abuse for pregnant women exist. The Swiss Working Group for Perinatal Pharmacology has been editing monographs for health care professionals on medication during pregnancy; in 2016, it also edited one about substance abuse during pregnancy (monographs available at http://www.sappinfo.ch/). Besides using the visits to the obstetric provider to obtain the needed information, pregnant women can directly contact pharmacies and midwife organisations or, in acute situations, the Swiss Teratogen Information Service and Tox Info Suisse, the Swiss provider of a hotline for queries on intoxication.

Every five years, an extensive health survey is carried out by the Swiss Federal Statistical Office on behalf of the Federal Council, in order to assess the self-reported health status of the inhabitants of Switzerland. So far, there have been five surveys (1992, 1997, 2002, 2007 and 2012). Their aim is to characterise the population older than 15 years and living in a private household in Switzerland [7] with respect to perceived state of health, diseases, health competencies and resources, use of health services, health insurance situation, living conditions and lifestyle features that could influence health. Typically, the surveys enable numerous analyses (for example, see [8]). The Swiss Health Survey has more and more come to resemble the European Health Interview System (EHIS), in order to enable better international comparison. Pregnancy was neither an inclusion nor exclusion criterion, but all female participates were asked whether they are pregnant at the time of the survey.

The aim of this study was to describe various aspects of health in pregnant women in Switzerland, using the most recent data from the Swiss Health Surveys (2007 and 2012). We focused on the use of medication and drugs (alcohol, tobacco and illicit drugs); furthermore, several health-related behaviour and lifestyle aspects, including nutritional habits and physical activity levels, were characterised. In order to better evaluate the situation of pregnant women, data are shown side-by-side with those from a matched group of non-pregnant women. The implications of our work to improve health awareness programmes are discussed.

Methods

Ethics statement
This study was carried out in accordance with the Helsinki Declaration and with the Swiss laws and regulations. In compliance with Swiss Federal Law on data protection (Human Research Act, Article 2), the data were anonymised and irreversibly de-identified before use in the analysis. Therefore, the present work did not need approval from an ethics committee.

Selection and description of participants
We wanted to use the most recent available data from the Swiss Health Surveys on pregnant women. Preliminary analysis of the survey from 2012 revealed that only 147 women were pregnant at the time of the interviews. To increase sample size, we merged data from this survey with

the data from the immediately previous survey (2007), which included 162 pregnant women. The present analysis was therefore performed on 309 pregnant women. For comparison, data from non-pregnant women matched to the pregnant participants were include in the analysis (see below).

The basic population of the Swiss Health Surveys 2007 and 2012 was anyone registered as living in Switzerland and aged 15 years or older, except people living in care homes, hospitals, boarding schools, hotels, monasteries, prison or anyone in the process of claiming asylum. Every registered household was therefore part of the basic population and could possibly be chosen to take part in the health survey. A stratified random sampling procedure based on registries of inhabitants was followed, with the Swiss cantons used as strata. The net sample of each survey year were 10 000 interviews equally distributed between the cantons. The cantons were allowed to increase their samples to representative numbers, which led to a net sample of 18 760 telephone and 14 393 written interviews in 2007, and 21 597 telephone and 18 357 written questionnaires in 2012.

Data collection and editing
The telephone interviews were announced a week in advance in a letter and could be via either a fixed telephone line or a mobile phone. The health survey then began with a telephone interview, followed by a written questionnaire sent to the participants. Those not able to respond properly to the telephone interview, for example because of hearing or speaking difficulties, could have a face-to-face interview. Because of language problems (such as not understanding German, French or Italian), age problems or mental disability, 3% of the interviews were with a representative such as a close family member. The interviews with a representative were shortened, as rather personal questions and questions about attitude could not be expected to be judged properly by a representative. The questions not asked were marked "PROXY" in the datasets. The written questionnaire could be answered on paper or online. The majority (88%) of the participants who were interviewed by telephone agreed to complete the written questionnaire. The interviews were in one of the three most widely spoken national languages – German, French or Italian – according to the participant's preference. The inquiries were distributed throughout the year to minimise seasonal influences on health status. Most topics were opened with a general question followed by more detailed questions only for the group of interest. For instance, in the case of "Have you ever consumed drugs in your life?", whoever answered "no" was filtered out, i.e., was not asked the more detailed questions on the same subject and the place to enter the answer was recorded as "was not asked" in the datasets. When appropriate, participants could answer "I don't know" or "no answer".

Three files from each of the Swiss Health Surveys of 2007 and 2012 containing data collected by telephone interview, a written self-administered questionnaire and calculated indices were merged. To be able to merge data from the health surveys 2007 and 2012, the text of all questions was checked for similarity. In most cases, the text was identical. In some cases, minor differences were detected, requiring small adjustments of categorical variables such as

fusion of two categories or splitting of one category by logical combination of information derived from two variables (not shown). The two following fusions concern different phrasings in the two surveys, might have slightly influenced the analysis, and therefore are shown here:

1. In 2007, the section on marijuana and ecstasy consumption was introduced by the question "Do you still consume marijuana/ecstasy?". In 2012, the corresponding question was "Have you consumed marijuana/ecstasy within the last twelve months?". These two questions have been set as equivalent in order to give an idea of current marijuana and ecstasy consumption.

2. In 2007, participants were asked "Have you ever consumed drugs other than marijuana, heroin, cocaine, methadone or ecstasy?", whereas in 2012 the corresponding question was "Have you ever consumed other drugs (e.g. Speed, LSD, hallucinogenic mushrooms)?" These two questions have been considered to be equivalent here.

Statistical analysis

Numerous variables were considered in the present analysis. For reasons of space they are not listed here, but can easily be found in the Results section. It should be noted that the consumption of alcohol was surveyed by asking about consumption within the last 7 days and within the last 12 months, and about alcohol type, frequency and amount consumed. Tobacco consumption was characterised in terms of amount and type, age at beginning of regular smoking, attempts and desire to quit and secondhand smoke (passive smoking). The section on drug consumption started with a general question about ever having tried drugs, and continued with more questions about the types of drugs, consumption frequency in the past and current consumption.

Pregnancy was considered as the primary variable in the present analysis and was used to define two groups of female participants, namely those who were pregnant and those who were not pregnant (reference group). All outcomes were compared between these two participant groups. To reduce possible bias due to differences between the two groups, propensity score matching was performed (logit scale with a calliper of 0.2). The propensity score calculation was based on a logistic regression model and included the following variables: age, language area and year of health survey. A total of 10 753 women were tentatively matched to the 309 pregnant women with a ratio of 10:1, yielding a matched reference group consisting of 3090 women.

Categorical variables are presented as numbers and corresponding percentages, and data from the two groups were compared with the chi-square test or with the Fisher's exact test, as appropriate. Continuous variables are shown as mean, standard deviation and first and third quartiles; possible differences between the two groups were detected by using the Mann-Whitney U-test. In all cases, two-sided p-values smaller than 0.05 were considered statistically significant. The number of valid answers available in each case is shown. All statistical analyses were run using IBM SPSS Statistics (Version 23.0. Armonk, NY: IBM Corp, USA). Propensity score matching was done using the package Matching [9].

Results

Sociodemographic aspects

As expected from the matching procedure, the groups of pregnant and reference (non-pregnant) women were similar in age, language area and year of health survey (table 1). Furthermore, the two groups did not differ in housing environment, distribution across the regions of Switzerland, employment status, satisfaction with their job, not being afraid of losing their job and mean net income of the entire household. Statistically significant differences between the pregnant group and the reference group were found for marital status, percentage of foreigners and origin of foreigners. Even though not significant (p = 0.052, data not shown), a tendency toward a higher education level was found in the pregnant group. Finally, pregnant women earned CHF 106.7 more per month than their matched non-pregnant women (p = 0.042).

Health status and health awareness

Most women reported having good or even very good health (table 2); in this respect, no difference was found between the two groups. Only 0.3% in the pregnant group and 1.5% in the reference group said they had bad or very bad health. Pregnant women less frequently reported being affected by a long-term medical problem. The number of women with a diagnosis of high blood pressure was similar in the two groups: 10.0 and 8.8%. Current blood pressure, however, was more often in the normal range in the pregnant group than in the reference group. For the self-reported psychological stress level, pregnant women seemed to be less stressed, as 83.2% stated they had little psychological stress, compared with 78.0% in the reference group. The opposite situation was observed for physical discomfort: pregnant women faced more physical discomfort than the reference group. Most women had at least one person they could talk to about personal problems; only 1.0% in the pregnant group and 2.8% in the reference group denied having anyone to talk to about personal problems.

Fewer women in the pregnant group than in the reference group had a general practitioner (79.0 vs 84.6%). Accordingly, pregnant women had fewer consultations with their general practitioners: on average one consultation fewer during the previous 12 months. On the other hand, consultations with any physician (e.g., a gynaecologist) were more often reported by the pregnant group: 5.5 times in the pregnant group and 1.7 times in the reference group. As expected, the reason for the most recent consultation with the gynaecologist was pregnancy in 93.5% of the pregnant group (data not shown). The majority of the two groups (71.8% in the pregnant group and 65.9% in the non-pregnant group) had additional insurance for complementary medicine.

The answers to a general question on whether health-related concerns affect lifestyle were comparable between the two groups (table 3). The majority of women stated that thoughts about health affected their lifestyle. Some pregnant and non-pregnant women even said that thoughts about health determined their lifestyle (17.3 and 15.1%, respectively) and only a few stated that they lived without thinking about health at all (8.8 and 10.5%, respectively).

Attitudes towards nutrition, diet and exercise

Most women revealed high nutritional awareness, stating that they paid attention to what they ate. This was significantly more frequent in the pregnant group (78.3%) than in the reference group (73.0%). However, the majority of all participants (86.4% in the pregnant group, 87.2% in the reference group) did not follow a specific diet (see table 3). Participants who were following a specific diet gave the following reasons for the diet: in the pregnant group, to lose weight (45.2%), medical reasons (28.6%) and other reasons (26.2%); in the reference group, to lose weight (61.3%), medical reasons (20.5%) and other rea-

Table 1: Sociodemographic characteristics of the pregnant women and matched non-pregnant women participating at the Swiss Health Surveys 2007 and 2012.

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	% or (quartiles)	
Swiss Health Survey (matching variable)					0.088
2007	147 / 309	47.6	1627 / 3090	52.7	
2012	162 / 309	52.4	1463 / 3090	47.3	
Age in years (matching variable)	31.7 (4.9)	(28, 35)	31.9 (5.5)	(28, 36)	0.54
Language area(matching variable)					0.2
Swiss German	194 / 309	62.8	2030 / 3090	65.7	
French	93 / 309	30.1	910 / 3090	29.4	
Italian	22 / 309	7.1	150 / 3090	4.9	
Marital status					<0.001*
Single	58 / 309	18.8	1362 / 3089	44.1	
Married	238 / 309	77.0	1527 / 3089	49.4	
Other (divorced, separated, registered partnership, widowed)	13 / 309	4.2	200 / 3089	6.5	
Housing area					0.33
Urban	224 / 309	72.5	2158 / 3090	69.8	
Countryside	85 / 309	27.5	932 / 3090	30.2	
Region of Switzerland					0.45
Lake Geneva region	55 / 309	17.8	568 / 3090	18.4	
Espace Mittelland	67 / 309	21.7	713 / 3090	23.1	
North-western Switzerland	45 / 309	14.6	415 / 3090	13.4	
Zurich	41 / 309	13.3	353 / 3090	11.4	
Eastern Switzerland	35 / 309	11.3	380 / 3090	12.3	
Central Switzerland	44 / 309	14.2	514 / 3090	16.6	
Ticino	22 / 309	7.1	147 / 3090	4.8	
Nationality					0.001*
Swiss	213 / 309	68.9	2387 / 3089	77.3	
Other	96 / 309	31.1	702/ 3089	22.7	
Origin of non-Swiss					0.001*
Europe	65 / 96	67.7	588 / 702	83.8	
North America	2 / 96	2.0	10 / 702	1.4	
South America, incl. Caribbean	12 / 96	12.5	28 / 702	4.0	
Asia	13 / 96	13.5	51 / 702	7.3	
Africa	4 / 96	4.2	25 / 702	3.6	
Paid work					0.001*
Yes	222 / 307	72.3	2475 / 3073	80.5	
No	85 / 307	27.7	598 / 3073	19.5	
Full-time or part-time					0.058
Full-time	90 / 271	33.2	1110 / 2827	39.3	
Part-time	181 / 271	66.8	1717 / 2827	60.7	
Degree of employment in percentage	n = 164		n = 1809		0.093
	61.1 (27.8)	(40, 80)	65.1 (29.8)	(40, 100)	
Degree of employment in groups					0.001*
90–100%	92 / 269	34.2	1187 / 2807	42.3	
70–89%	24 / 269	8.9	333 / 2807	11.9	
50–69%	43 / 269	16.0	266 / 2807	9.5	
<50%	110 / 269	40.9	1021 / 2807	36.4	
Net income of the entire household (CHF per month)	n = 244		n = 1956		0.34
	8235 (4402)	(5800, 10 000)	8150 (5735)	(5500, 9500)	
Personal net income (CHF per month)	n = 266		n = 2683		0.042*
	3168 (5470)	(575, 4100)	3061 (2685)	(1000, 4500)	

* Difference between the two groups statistically significant (p <0.05)

sons (20.5%). Accordingly, pregnant women were significantly more satisfied with their own body weight than the non-pregnant women. Whereas in the pregnant group, 34.6% of the women stated they were very satisfied and 45.1% said they were mostly satisfied, in the reference group 27.1% were very satisfied and 40.6% mostly satisfied. Despite these differences, the average body mass index (BMI) in the pregnant group before pregnancy and the present BMI in the reference group were within the normal range and identical (22.7 kg/m²). The majority of women had a normal weight (74.8% of the pregnant and 71.4% of the non-pregnant). The remaining women were mostly overweight (15.7 and 15.0%), or underweight (5.6 and 8.1%) or strongly overweight (3.9 and 5.4%).

The number of daily fruit portions and vegetable/salad intake were similar in the two groups (table 3); in both cases, a considerable proportion of the women (39.8 and 40.2%, respectively) reported eating one or two portions of fruit daily. Pregnant women consumed more milk products per day than did non-pregnant women. In the pregnant group, 66.1% of women had two or more milk products per day, compared with 50.4% in the reference group. Only 1.9% of the pregnant women claimed to be vegetarian, whereas in the reference group, 5.6% said they were. Moreover, 1.0% of the pregnant women and 2.0% of the reference group ate meat less often than once per week. In the category of eating meat once to four times per week, the corresponding value was higher in the pregnant group (74.1 vs 63.3%). Fish consumption seemed to be more popular in the pregnant group. Only 6.1% of the pregnant women reported not eating fish at all, a result markedly lower than in the reference group (12.3%). Women eating fish less than once per week were rarer in the pregnant group (21.0 vs 24.9% in the reference group).

When participants were asked whether they thought they performed enough physical activity to maintain their health, answers were divided: 52.3% of the pregnant and 51.8% of the non-pregnant group thought they did, where-

Table 2: Health status of the pregnant women and matched non-pregnant women participating at the Swiss Health Surveys 2007 and 2012.

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	% or (quartiles)	
Self-reported state of health					0.29
Very good	126 / 309	40.8	1103 / 3089	35.7	
Good	164 / 309	53.1	1723 / 3089	55.8	
Medium	18 / 309	5.8	216 / 3089	7.0	
Bad	1 / 309	0.3	32 / 3089	1.0	
Very bad	0 / 309	0.0	15 / 3089	0.5	
Having a long lasting medical problem					<0.001*
Yes	38 / 309	12.3	654 / 3089	21.2	
No	271 / 309	87.7	2435 / 3089	78.8	
High blood pressure (diagnosed by a physician)					0.47
Yes	31 / 309	10.0	271 / 3082	8.8	
No	278 / 309	90.0	2811 / 3082	91.2	
Current blood pressure					0.014*
Normal	237 / 288	82.3	2268 / 2874	78.9	
Too high	8 / 288	2.8	34 / 2874	1.2	
Too low	43 / 288	14.9	572 / 2874	19.9	
Physical discomforts					<0.001*
No discomfort/almost no discomforts	63 / 287	22.0	919 / 2835	32.4	
Some discomforts	115 / 287	40.1	1131 / 2835	39.9	
A lot of discomforts	109 / 287	37.9	785 / 2835	27.7	
Psychological stress					0.047*
High	8 / 286	2.8	174 / 2953	5.9	
Middle	40 / 286	14.0	476 / 2953	16.1	
Low	238 / 286	83.2	2303 / 2953	78.0	
Having someone to talk to about personal problems					0.093
Yes, more than 1 person	226 / 289	78.2	2364 / 2969	79.6	
Yes, 1 person	60 / 289	20.8	521 / 2969	17.5	
No	3 / 289	1.0	84 / 2969	2.8	
Having a general practitioner					0.01*
Yes	244 / 309	79.0	2612 / 3088	84.6	
No	65 / 309	21.0	476 / 3088	15.4	
Number of consultation with the general practitioner in the past 12 months	n = 229		n = 2206		<0.001*
	1.5 (3.1)	(0, 2)	2.3 (4.6)	(0, 3)	
Consultation with any physician in the past 12 months					<0.001*
Yes	306 / 309	99.0	2665 / 3089	86.3	
No	3 / 309	1.0	424 / 3089	13.7	
Number of consultations with any physician	n = 303		n = 2639		<0.001*
	7.1 (5.3)	(4,10)	5.0 (8)	(1, 5)	

* Difference between the two groups statistically significant (p <0.05)

Table 3: Attitudes towards health, nutrition, own weight and diet of the pregnant women and matched non-pregnant women participating in the Swiss Health Surveys 2007 and 2012.

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	% or (quartiles)	
Health concerns affect lifestyle					0.53
I live without thinking about health	22 / 249	8.8	261 / 2484	10.5	
Thoughts about health affect lifestyle	184 / 249	73.9	1847 / 2484	74.4	
Thoughts about health determine lifestyle	43 / 249	17.3	376 / 2484	15.1	
Nutritional awareness					0.043*
Yes, I pay attention to something	242 / 309	78.3	2252 / 3086	73.0	
No, I don't pay attention to anything	67 / 309	21.7	834 / 3086	27.0	
Specific diet					0.7
Yes	42 / 309	13.6	396 / 3090	12.8	
No	267 / 309	86.4	2694 / 3090	87.2	
Reason for specific diet					0.13
To lose weight, without medical reason	19 / 42	45.2	242 / 395	61.3	
Medical reasons	12 / 42	28.6	81 / 395	20.5	
Other reasons	11 / 42	26.2	72 / 395	18.2	
Satisfaction with body weight					<0.001*
Very satisfied	99 / 286	34.6	804 / 2969	27.1	
Mostly satisfied	129 / 286	45.1	1205 / 2969	40.6	
Not entirely satisfied	43 / 286	15.0	693 / 2969	23.3	
Not satisfied at all	15 / 286	5.2	267 / 2969	9.0	
Body mass index (kg/m^2)	n = 305		n = 3064		0.3
	22.7 (3.5)	(20.2, 24.2)	22.7 (4.1)	(19.9, 24.2)	
Daily fruit intake (number)					0.088
0	0 / 264	0.0	6 / 2546	0.2	
Never	31 / 264	11.7	433 / 2546	17.0	
Fewer than 1	53 / 264	20.1	534 / 2546	21.0	
1 to 2	105 / 264	39.8	1023 / 2546	40.2	
3 to 4	63 / 264	23.9	463 / 2546	18.2	
5	12 / 264	4.5	87 / 2546	3.4	
Number of portions of vegetable/salad daily					0.53
0	0 / 268	0.0	1 / 2715	0.0	
Never	24 / 268	9.0	314 / 2715	11.6	
Fewer than 1	64 / 268	23.9	583 / 2715	21.5	
1 to 2	132 / 268	49.3	1390 / 2715	51.2	
3 to 4	37 / 268	13.8	341 / 2715	12.6	
5	11 / 268	4.1	86 / 2715	3.2	
Daily milk product intake (number)					<0.001*
Less than 1 portion	3 / 221	1.4	34 / 1952	1.7	
Approx. 1	72 / 221	32.6	935 / 1952	47.9	
2 portions	104 / 221	47.1	737 / 1952	37.8	
3 or more portions	36 / 221	16.3	219 / 1952	11.2	
4 or more portions	6 / 221	2.7	27 / 1952	1.4	
Weekly consumption of meat/sausages					0.009*
Never	6 / 309	1.9	173 / 3086	5.6	
1 day per week	27 / 309	8.7	250 / 3086	8.1	
2 days per week	61 / 309	19.7	454 / 3086	14.7	
3 days per week	87 / 309	28.2	734 / 3086	23.8	
4 days per week	54 / 309	17.5	516 / 3086	16.7	
5 days per week	26 / 309	8.4	366 / 3086	11.9	
6 days per week	14 / 309	4.5	138 / 3086	4.5	
7 days per week	31 / 309	10.0	393 / 3086	12.7	
More rarely	3 / 309	1.0	62 / 3086	2.0	
Weekly consumption of fish					0.002*†
Never	19 / 309	6.1	381 / 3087	12.3	
1 day per week	151 / 309	48.9	1340 / 3087	43.4	
2 days per week	48 / 309	15.5	402 / 3087	13.0	
3 days per week	20 / 309	6.5	126 / 3087	4.1	
4 days per week	1 / 309	0.3	36 / 3087	1.2	

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	% or (quartiles)	
5 days per week	3 / 309	1.0	14 / 3087	0.5	
6 days per week	0 / 309	0.0	7 / 3087	0.2	
7 days per week	2 / 309	0.6	11 / 3087	0.4	
More rarely	65 / 309	21.0	770 / 3087	24.9	

* Difference between the two groups statistically significant (p <0.05) † Fisher's Exact Test

as 47.7 and 48.2%, respectively, thought they did not (table 4). Some form of leisure exercise enough to cause sweating once a week was reported by approximately half the pregnant women, which was less than in the reference group. Pregnant (and non-pregnant) women reported doing easy activities such that they became out of breath at some point for 90.4 (and 93.0) minutes daily.

There was a significant difference between the groups in the practice of fitness, sports or gymnastics. Pregnant women did less of these sports than women in the reference group (frequency, duration, extent and intensity were significantly lower in the pregnant group).

Medication

The consumption of medications in general within the previous 7 days was comparable between the two groups (table 5). Thirty-nine per cent (38.8%) of the pregnant and 42.7% of the non-pregnant women had used a (conventional) medication. Of the 120 pregnant women who reported taking medication within the previous 7 days, the type of medication could be identified with subsequent ques-

tions in 52 cases. The results show that 36 women took pain killers, 1 woman blood pressure medication, 2 women sleeping pills, 3 women tranquilizers, 5 women asthma medications, 4 women antidepressants and 1 woman diabetes medication. Use of the various medications was comparable among pregnant and non-pregnant women, except in the case of pain killers. Pregnant women took significantly fewer pain killers compared with the reference group (daily use 5.0 vs 11.0%; once per week to several times per week 25 vs 50.5%). Furthermore, the majority of the pregnant group, but only a minority of the non-pregnant women, used pain killers prescribed by the physician (66.7 vs 35.2%).

The use of acupuncture, traditional Chinese medicine, homeopathy, herbal medicine, shiatsu/foot reflexology, Indian medicine/Ayurveda and osteopathy within the previous 12 months was comparable in the two participant groups and no difference was seen in the frequency of consultations with an alternative practitioner (no data available for the previous 7 days; not shown).

Table 4: Exercise performed by the pregnant women and matched non-pregnant women participating at the Swiss Health Surveys 2007 and 2012.

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	% or (quartiles)	
Performs enough physical activity					0.89
Yes	150 / 287	52.3	1531 / 2954	51.8	<0.001*
No	137 / 287	47.7	1423 / 2954	48.2	
Moving in leisure that causes sweating 1x/week					
Yes	149 / 289	51.6	2065 / 2971	69.5	
No	140 / 289	48.4	906 / 2971	30.5	
Moving that causes being out of breath (min/day)	n = 217		n = 2369		
	90.4 (81.2)	(60, 120)	93.0 (92.2)	(45, 120)	0.68
Doing fitness, sports or gymnastics					<0.001*
Yes	133 / 309	43.0	1886 / 3090	61.0	
No	176 / 309	57.0	1204 / 3090	39.0	
Frequency of doing fitness, sports or gymnastics					0.034*
Almost daily	6 / 133	4.5	182 / 1886	9.7	
Few times per week	56 / 133	42.1	930 / 1886	49.3	
Approx. once per week	64 / 133	48.1	678 / 1886	35.9	
Approx. 1 to 3 times per month	7 / 133	5.3	86 / 1886	4.6	
Less than once per month	0 / 133	0.0	10 / 1886	0.5	
Duration of fitness, sports or gymnastics (minutes/week)	n = 130		n = 1810		0.002*
	150.0 (127.3)	(60, 180)	189.2 (169.5)	(90, 240)	
Extent and intensity of weekly exercise					0.001*
Inactive	47 / 289	16.3	327 / 2959	11.1	
Partly active	76 / 289	26.3	649 / 2959	21.9	
Irregularly active	73 / 289	25.3	772 / 2959	26.1	
Regularly active	44 / 289	15.2	404 / 2959	13.7	
Trained	49 / 289	17.0	807 / 2959	27.3	

* Difference between the two groups statistically significant (p <0.05)

Alcohol and tobacco

The pregnant group was more restrictive towards alcohol consumption than the reference group (table 6). Women in the pregnant group had drunk significantly less beer in terms of amount and frequency during the previous 7 days. Wine consumption was also lower in the pregnant group, even though 31 out of the 309 pregnant women (10.0%) reported drinking wine within the previous 7 days. Twenty-eight of the pregnant women who said they had drunk wine in the previous 7 days (i.e., 93.3%) reported drinking it once or twice during the previous week. In terms of the amount of wine, women in the pregnant group drank significantly less. The majority (80%) of pregnant women who reported drinking wine in the previous 7 days drank one glass. In contrast, regarding frequency of wine drinking over the previous 12 months, the women in the pregnant group reported drinking wine more often than the women in the reference group.

The prevalence of tobacco consumption was significantly lower in the pregnant group than in the reference group (11.7 vs 30.3%). All pregnant women who reported consuming tobacco did so by smoking cigarettes. In the reference group, most tobacco consuming women also smoked cigarettes (98.4%), but 1.6% consumed tobacco in other forms, such as cigars, cigarillos, pipes or water pipes. Among those women who smoked cigarettes, the average number of cigarettes smoked per day was 5.1 in the pregnant group and 8.7 in the reference group. The majority of women who consumed tobacco did so on a daily basis (66.7% of the pregnant and 69.6% of the reference group). Of the non-smokers only, significantly more women in the pregnant group said they had smoked regularly in the past (36.6 vs 19.9%). In both groups, most women started smoking at an age between 17 and 18 years (on average, 17.9 years old in the pregnant group and 17.6 years old in the reference group). Half of the pregnant smokers had tried to quit smoking (18/36, 50.0%). This was significantly more than in the reference group, in which 29.1% (265/912) had made efforts to quit. Of the pregnant women who were smokers and had never tried to quit smoking, the majority (11/17, 64.7%) currently wished to quit smoking. In comparison, 46.6% (299/641) of the women in the reference group who smoked and had never tried to quit smoking stated that they wished to quit. Pregnant women were exposed to second-hand smoke for a shorter time than the women in the reference group (on average 24.9 and 33.0 minutes daily, p = 0.008).

Table 5: Medication intake in the previous 7 days by the pregnant women and matched non-pregnant women participating at the Swiss Health Surveys 2007 and 2012.

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	% or (quartiles)	
Medication intake					0.19
Yes	120 / 309	38.8	1318 / 3087	42.7	
No	189 / 309	61.2	1769 / 3087	57.3	
Pain killer					<0.001[*]
Daily	6 / 120	5.0	136 / 1234	11.0	
Several times per week	10 / 120	8.3	223 / 1234	18.1	
Approx. once per week	20 / 120	16.7	400 / 1234	32.4	
Never	84 / 120	70.0	475 / 1234	38.5	
Prescription for the pain killer					<0.001[*]
Prescribed by a physician	24 / 36	66.7	267 / 759	35.2	
Self-bought	12 / 36	33.3	492 / 759	64.8	
Blood pressure medication					0.61
Yes	1 / 119	0.8	45 / 1235	3.6	
No	118 / 119	99.2	1190 / 1235	96.4	
No answer	1		0		
Heart medication					0.78
Yes	0 / 120	0.0	15 / 1235	1.3	
No	120 / 120	100	1220 / 1235	98.8	
Sleeping pill					0.33
Yes	2 / 120	1.6	53 / 1235	4.3	
No	118 / 120	98.3	1182 / 1235	95.7	
Tranquilizer					0.25
Yes	3 / 120	2.5	93 / 1234	7.5	
No	117 / 120	97.5	1141 / 1234	92.5	
Asthma medication					0.52
Yes	5 / 120	4.1	43 / 1235	3.5	
No	115 / 120	95.8	1192 / 1235	96.5	
Antidepressants					0.27
Yes	4 / 120	3.3	104 / 1235	8.5	
No	116/ 120	96.7	1131 / 1235	91.6	
Diabetes medication					1.0
Yes	1 / 120	0.8	11 / 1235	0.9	
No	119 / 120	99.2	1224 / 1235	99.1	

* Difference between the two groups statistically significant (p <0.05)

Table 6: Alcohol consumption and smoking by the pregnant women and matched non-pregnant women participating at the Swiss Health Surveys 2007 and 2012.

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	Frequency n/N or Mean (SD)	
Usual alcohol consumption					<0.001*
Twice per day	0 / 309	0.0	6 / 3088	0.2	
Once per day	2 / 309	0.6	74 / 3088	2.4	
Several times per week	6 / 309	1.9	206 / 3088	6.7	
1 or 2 times per week	56 / 309	18.1	1045 / 3088	33.8	
1 to 3 times per month	53 / 309	17.2	699 / 3088	22.6	
Less than once per month	56 / 309	18.1	464 / 3088	15.0	
Never, abstinent	136 / 309	44	594 / 3088	19.2	
No	110 /117	94	1402 / 2029	69.1	
Frequency of beer consumption during the last 7 days					0.43
3 times per day or more	0 / 7	0.0	3 / 622	0.5	
Twice per day	0 / 7	0.0	4 / 622	0.6	
Once per day	1 / 7	14.3	29 / 622	4.7	
Almost daily	0/7	0.0	7 / 622	1.1	
3 or 4 times this week	0 / 7	0.0	77 / 622	12.4	
Once or twice this week	6 / 7	85.7	502 / 622	80.7	
Beer consumption during the last 12 months					0.28
Yes	65 / 110	59.1	754 / 1403	53.7	
No	45 / 110	40.9	649 / 1403	46.3	
Frequency of beer consumption during the last 12 months					0.035*
Weekly	8 / 60	13.3	32 / 731	4.4	
2-3 times per month	10 / 60	16.7	138 / 731	18.9	
Approximately once per month	17 / 60	28.3	188 / 731	25.7	
Less than once per month	25 / 60	41.7	373 / 731	51.0	
Wine consumption during the past 7 days					<0.001*
Yes	31 / 117	26.5	1325 / 2028	65.3	
No	86 / 117	73.5	703 / 2028	34.7	
Frequency of wine consumption during the last 7 days					0.2
Twice per day	0 / 30	0.0	5 / 1307	0.4	
Once per day	1 / 30	3.3	74 / 1307	5.7	
Almost daily	1 / 30	3.3	22 / 1307	1.7	
3 or 4 times this week	0 / 30	0.0	140 / 1307	10.7	
Once or twice this week	28 / 30	93.3	1066 / 1307	81.6	
Amount of wine consumed per occasion during the last 7 days					<0.001*
5dl or more	0 / 30	0.0	36 / 1307	2.8	
3 to 4 dl (3–4 glasses)	1 / 30	3.3	215 / 1307	16.4	
2 dl (2 glasses)	5 / 30	16.7	554 / 1307	42.4	
1 dl (1 glass)	24 / 30	80.0	502 / 1307	38.4	
Wine consumption during the last 12 months					<0.001*
Weekly	23 / 76	30.3	52 / 599	8.7	
2–3 times per month	25 / 76	32.9	190 / 599	31.7	
Approximately once per month	22 / 76	28.9	204 / 599	34.1	
Less than once per month	6 / 76	7.9	153 / 599	25.5	
Tobacco consumption					<0.001*
Yes	36 / 309	11.7	936 / 3090	30.3	
No	273 / 309	88.3	2154 / 3090	69.7	
Daily tobacco consumption					0.71
Yes	24 / 36	66.7	651 / 936	69.6	
No	12 / 36	33.3	285 / 936	30.4	
Consumption of cigarettes					1.0
Yes	36 / 36	100	921 / 936	98.4	
No	0 / 36	0.0	15 / 936	1.6	
Number of cigarettes smoked per day	n = 35		n = 894		0.013*
	5.1 (5.4)	(0, 8)	8.7 (8.2)	(1, 15)	
Non-smokers: have you ever smoked regularly for more than 6 months?					<0.001*
Yes	100 / 273	36.6	429 / 2154	19.9	
No	173 / 273	63.4	1725 / 2154	80.1	

	Pregnant group (N = 309)		Non-pregnant group (reference, N = 3090)		p-value
	Frequency n/N or Mean (SD)	% or (quartiles)	Frequency n/N or Mean (SD)	Frequency n/N or Mean (SD)	
Age at the beginning of regular smoking (years)	n = 131		n = 1306		0.14
	17.9 (3.4)	(16, 20)	17.6 (3.3)	(16, 19)	
Ever tried to quit smoking					0.007[*]
Yes	18 / 36	50.0	265 / 912	29.1	
No	18 / 36	50.0	647 / 912	70.9	
Wish to quit smoking					0.14
Yes	11 / 17	64.7	299 / 641	46.6	
No	6 / 17	35.3	342 / 641	53.4	
Second-hand smoke: total minutes/day	n = 285		n = 2919		0.008[*]
	24.9 (113.4)	(0, 5)	33.0 (101.7)	(0,15)	

* Difference between the two groups statistically significant (p <0.05)

Illicit drugs

No difference was found between the prevalence of any lifetime consumption of illicit drugs in the two participant groups (defined as "at least once"; 27.4% in the pregnant group and 28.4% in the reference group). Most of the women who had tried illicit drugs reported consuming marijuana (98.8 and 98.7%, respectively). The majority had smoked marijuana at least six times or more. The age of first marijuana consumption was between 17 and 18 years in both groups. For current consumption of marijuana, pregnant women were more restrictive than non-pregnant women. Six of the 309 pregnant women (1.9%) said they still consumed marijuana; in the reference group, 153 out of 3090 women (5.0%) reported current consumption. In the subgroup of women with current marijuana consumption, the frequency pattern was similar between the two groups. In the pregnant group, 25% consumed once or more per week, 25%, one to three times per month and 50%, less than once per month. In the reference group, 18.5% consumed it once per week or more, 21.2%, one to three times per month and 60.3% less than once per month. Of the subgroup of women who reported ever consuming drugs other than marijuana in their life, 7/13 pregnant women (53.8%) and 125/185 non-pregnant women (67.6%) said they had tried cocaine. These proportions correspond to 2.3% of the whole pregnant group (7/309) and 4.1% of the whole non-pregnant group (125/3090). Current cocaine consumption was reported only in the reference group, in which 16.8% of all women who had ever consumed cocaine reported doing so currently (21/125). The majority (80.0%) consumed it less than once per month. The 21 women reporting current cocaine consumption represented 0.7% of the whole reference group (n = 3090). Earlier ecstasy consumption was mentioned by 7/309 (2.3%) of the pregnant women and 118/3090 (3.8%) of the reference group. None of the pregnant women consumed ecstasy currently, whereas some of the women from the reference group who had tried ecstasy (11.9%, 14/118) reported current consumption. Relative to the whole reference group, current ecstasy consumption corresponded to 0.5% (14/3090). No pregnant woman reported ever consuming heroin, whereas in the reference group 18 women said they had consumed heroin once, though none of them mentioned doing so currently. The 2007 survey included a question on methadone consumption, which no woman in the present analysis answered in the affirmative; in the 2012 survey, this question was dropped.

There was no significant difference between the two participant groups in the consumption of other illicit drugs. Current consumption of other drugs was denied by all pregnant women, whereas in the reference group, 12/3090 (0.4%) women reported current consumption of other drugs, 91.7% of them less frequently than once per month.

Discussion

Among the strengths of the present work is the novelty of the data on several aspects of women's health during pregnancy in Switzerland, some of which are of a sensitive character and are therefore difficult to access in non-anonymous situations. Even though only a small percentage of the women participating in each survey was pregnant, a considerable number of pregnant women participated in the two combined consecutive health surveys (n = 309). This enabled us to gain new insights into several sociodemographic and lifestyle factors during pregnancy, as well as the type and intake of medication, use of alcohol, tobacco and illicit drugs. Moreover, the comparison with a matched group of non-pregnant women revealed several pregnancy-specific aspects. Limitations of the analysis derive from the fact that the Swiss Health Surveys were not particularly designed to characterise the situation during pregnancy. For instance, no information is available on how advanced the pregnancy was. The group of pregnant women can, however, be assumed to be heterogeneous and include women in all pregnancy stages. Furthermore, all of the data collected by the Swiss Health Surveys are self-reported, i.e., they might have been affected by both unconscious and conscious factors.

Most sociodemographic and health-related lifestyle characteristics were comparable in the two groups of women. However, foreign women – from North America, South America (including the Caribbean), Asia, and Africa, but not from Europe – were more represented in the pregnant group. Although the large majority of pregnant women did paid work (72.3%), even more non-pregnant women were gainfully employed (80.5%). However, the majority of the pregnant women who did paid work earned more money per month than the women in the reference group, even though they had a lower work load. One interpretation could be that most women in Switzerland tend to wait to get pregnant until they are in a good financial situa-

tion. Another explanation could be that the more worry-free lifestyle connoted by lower income might be associated with not having children [10]. No marked difference in education and vocational classification level between the two groups was found, even though a pregnancy might have a negative impact on the woman's career. Although it might be expected that pregnant women tend to move to the countryside [11], no differences in domicile location were found between the two groups.

Pregnant women faced long-lasting medical problems less often than non-pregnant women. It seems plausible that some of those problems might more or less directly prevent a pregnancy, or at least have discouraged the women in question from getting pregnant [12]. Pregnancy is a period in which women appear to be particularly motivated to follow a healthy diet, among other reasons to avoid excessive gestational weight gain [13]. Pregnant women tended to have more moderate meat consumption than the reference group, as they more rarely reported intensive meat consumption, but also more rarely reported "never" eating meat. A possible explanation for the latter might be that pregnant women were more afraid of nutritional deficiencies associated with vegetarianism. This insecurity is, however, not supported by previous work showing that a plant-based dietary pattern with high fibre intake and less red or processed meat intake might even lower the risk of various health problems [14]. As fatty acid supply is critical during pregnancy, it is important to ensure sufficient uptake of omega-3-fatty acids to ensure healthy brain development of the fetus and to allow normal growth, as well as metabolic and immune system development for the child [15]. Our data showing that pregnant women ate relatively high amounts of fish (a good source omega-3-fatty acids [16]) suggest that, at least in Switzerland, there is high awareness of this nutritional necessity. Pregnant women did less fitness, sports or gymnastics than the women from the reference group, which might be because pregnant women more easily become out of breath [17]. This decreased level of sports activity during pregnancy might be associated with a more cautious attitude during pregnancy or else with other discomforts (e.g., nausea, pain, fatigue).

Intake of medication in the previous 7 days did not significantly differ between the two participant groups, suggesting that most medications could not be dispensed with during pregnancy. Pain killers, however, were an exception, with markedly lower intake within the pregnant group, although pregnant women tended to have more physical discomfort (possibly pain, but also nausea and other common discomforts [18]) than the women in the reference group. The restricted intake of pain killers by pregnant women may be due to general efforts to minimise exposure of the fetus to medications, as they may pose a risk to the unborn child [19, 20]. Interestingly, pregnant women who consumed pain killers did so exclusively upon medical prescription, whereas women in the reference group mostly bought the medication themselves. This indicates that women more consistently relied on physicians' advice during pregnancy and suggests that the accompanying physicians are in a privileged position to council pregnant women.

Numerous studies have shown that alcohol consumption during pregnancy is detrimental for the unborn child. These studies has been recently evaluated in a meta-analysis [21], whose authors conclude that, whereas prenatal binge drinking detrimentally impacts on child cognition, even drinking less than daily might be detrimentally associated with child behaviour. In other words, there is no safe amount of alcohol to consume while pregnant. In line with the general recommendations to avoid all kinds of alcohol during pregnancy, alcohol consumption was less common in the pregnant group. Nevertheless, about 10% of the pregnant women reported drinking wine in the previous 7 days. Our data suggest that one to two glasses of wine are relatively often considered not to put the unborn child at risk [22]. Although the effects of alcohol on the fetus are dependent on the amount ingested, the toxic margins are not well delimited [23]. Therefore, pregnant women might be lulled into a false sense of security, thinking that a glass of wine cannot be so damaging. The frequency and amount of wine consumption suggests that most women did not drink wine because of alcohol dependence, since in this case, frequency and amount would be expected to be higher [24]. However, the accuracy of self-reported data concerning alcohol consumption remains unclear [25–28]. Therefore it is very possible that the amount of alcohol drunk during pregnancy was higher than shown in this work. The frequency of wine drinking within the previous 12 months was higher in the pregnant group. The reasons for this greater consumption are unclear, but might be related to the higher salary in this group. For instance, in Germany, alcohol consumption in the upper classes is markedly higher than in the low classes [3]. Even if a direct comparison of the data is difficult (different questions and time periods), the prevalence of alcohol consumption that we observed now in Switzerland appears to be in the same range as the average value reported by a survey in Germany. In Switzerland, 14% of the mothers consumed (mostly occasionally) alcohol during pregnancy (in our analysis, 10% drunk wine during the last 7 days). This German survey also revealed that participants without a migration background consumed three times more alcohol than participants with a migration background. This cultural aspect should be taken into account when planning health awareness campaigns.

Cigarette smoking has a strong impact on pregnancy and the neonate, being considered to be the most important modifiable risk factor associated with adverse pregnancy outcomes [29]. Accordingly, prevalence of tobacco consumption was markedly (three times) lower in the pregnant group than in the reference group. Since more women in the pregnant group reported having smoked regularly in the past, these data imply that a considerable percentage of women do have success in quitting smoking upon becoming pregnant or shortly before. Even though this is *per se* a very positive observation from the public health point of view, the data reveal as well that more than every tenth pregnant woman in Switzerland does smoke during pregnancy. This means that more prevention measures are required. In Germany, an even higher percentage of the mothers smoked during pregnancy (17–18% in Germany vs 11.7% in the present analysis), with women from lower social classes smoking four times more that participants of the higher social classes. In the USA, comparable data on general tobacco use were obtained; an analysis of data on pregnant women from 2005–2014 revealed a 13.3% prevalence [2].

Illicit drug consumption within the pregnant group was limited to the use of marijuana. Although investigation of the effects of marijuana on pregnancy outcomes is complex due to confounders such as tobacco smoking, other drug exposures and sociodemographic factors, associations between consumption and increased neonatal morbidity [30] or adverse birth outcomes [31] have been observed. In our analysis, the majority of the pregnant women reporting marijuana use did so less than once per week, suggesting that in this case also consumption was mostly just for occasional pleasure, without a typical addiction. In our opinion, this raises again the question of why consumption continues during pregnancy. Since the data were self-reported and participants might have understated their consumption, it is conceivable that real consumption might have been more frequent and therefore indicative of addictive behaviour. In the USA, comparable data on marijuana use were obtained; an analysis from 2005–2014 revealed that 1% of the pregnant women used marijuana (compared with 1.9% in the present analysis) [2].

Taken together, our data on use of alcohol, smoking and marijuana show that a considerable proportion of the pregnant women in Switzerland do not comply with the existing Swiss recommendations for stopping their use (see Introduction). Since our surveys reflect data from 2007–2012 and most of these recommendations are relatively recent, it is conceivable that their effect was not then apparent. Seeing the high health-awareness of the general female population, however, one should consider investigating (possibly with qualitative research methods) why women who are informed about the negative effects of use of alcohol, smoking and marijuana consumption during pregnancy are still not stopping their use. The data from Germany, revealing that upper social classes and participants without a migration background exhibit higher alcohol use, but lower social classes smoke more, suggest that a very differentiated approach is needed.

Conclusions

Our data indicate that during pregnancy most women try to improve their food intake, refrain from taking (non-prescribed) pain killers, and reduce their consumption of alcohol, cigarettes and drugs. All these changes attest to a high awareness of the new responsibilities that pregnant women take on and are likely to favourably affect health-related outcomes for their unborn children. From a public health point of view, the question that should be posed now is whether the observed prevalence of alcohol, cigarette and drug consumption can be still further reduced and, if so, what measures can be suggested to achieve a reduction. The initiative of the Swiss Society of Gynaecology and Obstetrics to include recommendations with view to improving mothers' health by preconception counselling (i.e., before pregnancy) appears promising. However, it is necessary that these recommendations reach all women of reproductive age, and so they should be propagated in other environments, such as at schools or during regular gynaecological check-ups. Finally, given the high health-related awareness in the general female population of child-bearing age in Switzerland, further investigations are needed to design specific support measures.

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