Gender Summit 9 Europe
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젠더혁신연구센터 ISTeR

Gender analysis in the relationship between red and processed meat intake and colorectal cancer: a systematic review and meta-analysis

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Introduction

- Colorectal Cancer (CRC)
  - is the 3rd most common cancer in men and the 2nd most common cancer in women worldwide
  - rates in men > women worldwide
- CRC and meat intake
  - Continuous Update Project (CUP) of the World Cancer Research Fund (WCRF) (2011)
  - **Convincing** evidence that consumption of red meat and processed meat ↑ CRC risk

FOOD, NUTRITION, PHYSICAL ACTIVITY AND CANCERS OF THE COLON AND THE RECTUM 2011		
	DECREASES RISK	INCREASES RISK
Convincing	Physical activity[1,2] Foods containing dietary fibre[3]	Red meat[4,5] Processed meat[4,6] Alcoholic drinks (men)[7] Body fatness Abdominal fatness Adult attained height[8]
Probable	Garlic Milk[9] Calcium[10]	Alcoholic drinks (women)[7]
Limited - suggestive	Non-starchy vegetables Fruits Foods containing vitamin D[3,12]	Foods containing iron[3,4] Cheese[11] Foods containing animal fats[3] Foods containing sugars13
Limited - no conclusion	Fish; glycaemic index; folate; vitamin C; vitamin E; selenium; low fat; dietary pattern	
Substantial effect on risk unlikely	None identified	

IARC
press release

International Agency for Research on Cancer

World Health Organization

PRESS RELEASE
N° 240

26 October 2015

IARC Monographs evaluate consumption of red meat and processed meat

Lyon, France, 26 October 2015 – The International Agency for Research on Cancer (IARC), the cancer agency of the World Health Organization, has evaluated the carcinogenicity of the consumption of red meat and processed meat.

Red meat

After thoroughly reviewing the accumulated scientific literature, a Working Group of 22 experts from 10 countries convened by the IARC Monographs Programme classified the consumption of red meat as *probably carcinogenic to humans* (Group 2A), based on *limited evidence* that the consumption of red meat causes cancer in humans and *strong* mechanistic evidence supporting a carcinogenic effect.

This association was observed mainly for colorectal cancer, but associations were also seen for pancreatic cancer and prostate cancer.

Processed meat

Processed meat was classified as *carcinogenic to humans* (Group 1), based on *sufficient evidence* in humans that the consumption of processed meat causes colorectal cancer.

Meat consumption and its effects

The consumption of meat varies greatly between countries, with from a few percent up to 100% of people eating red meat, depending on the country, and somewhat lower proportions eating processed meat.

The experts concluded that each 50 gram portion of processed meat eaten daily increases the risk of colorectal cancer by 18%.

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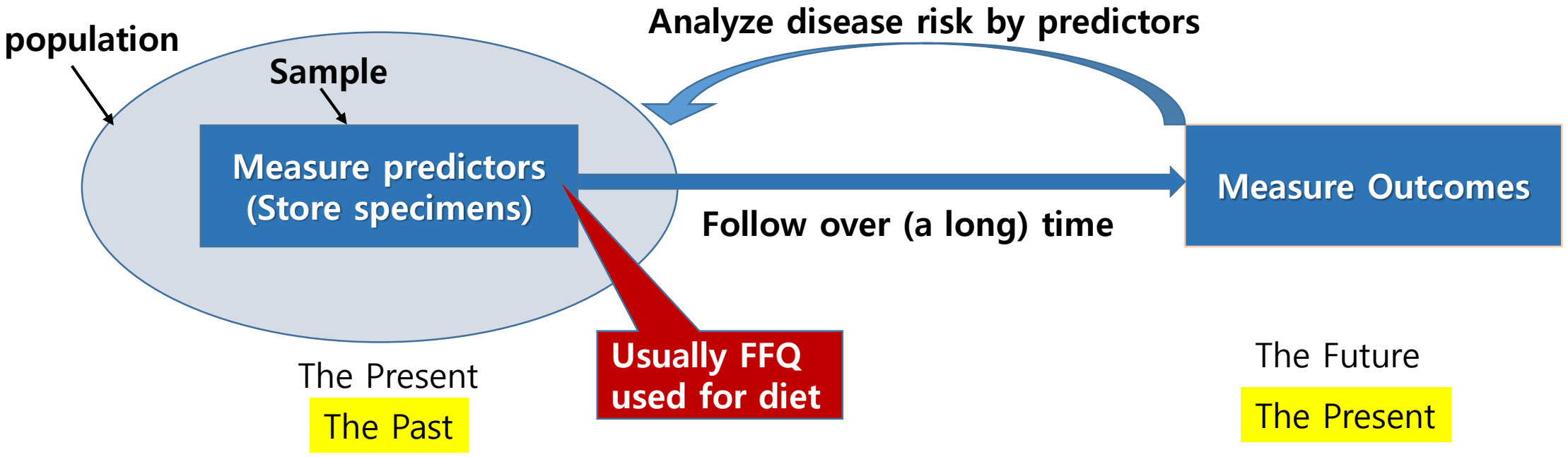
Prospective Cohort Studies

- **Cohort: a group of subjects from population, specified at the outset and followed over time**

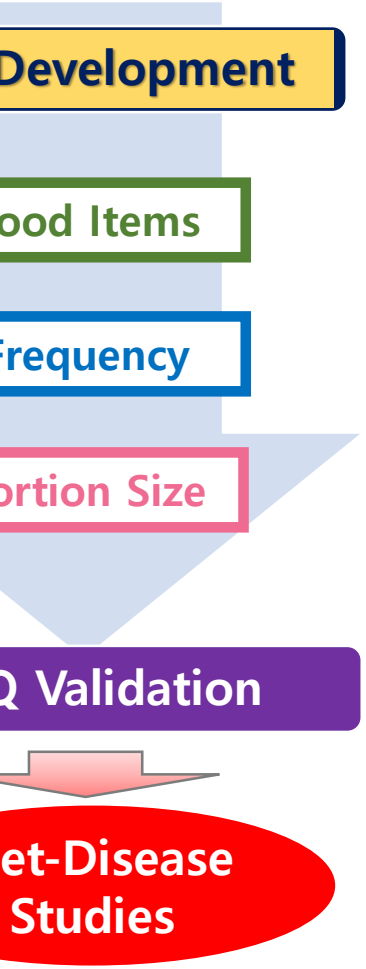
Steps to conduct a (prospective) cohort study

1. Select a sample from population
2. Measure predictor variables in the sample
3. Follow subjects over a (long) period of time
4. Measure outcome variable(s)
5. Analyze disease risk(s) for predictors measured at the beginning



Food Frequency Questionnaire

- Used in most cohort studies on diet and disease
- Aims to estimate usual dietary intake



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Gender analysis in the development and validation of FFQ: a systematic review

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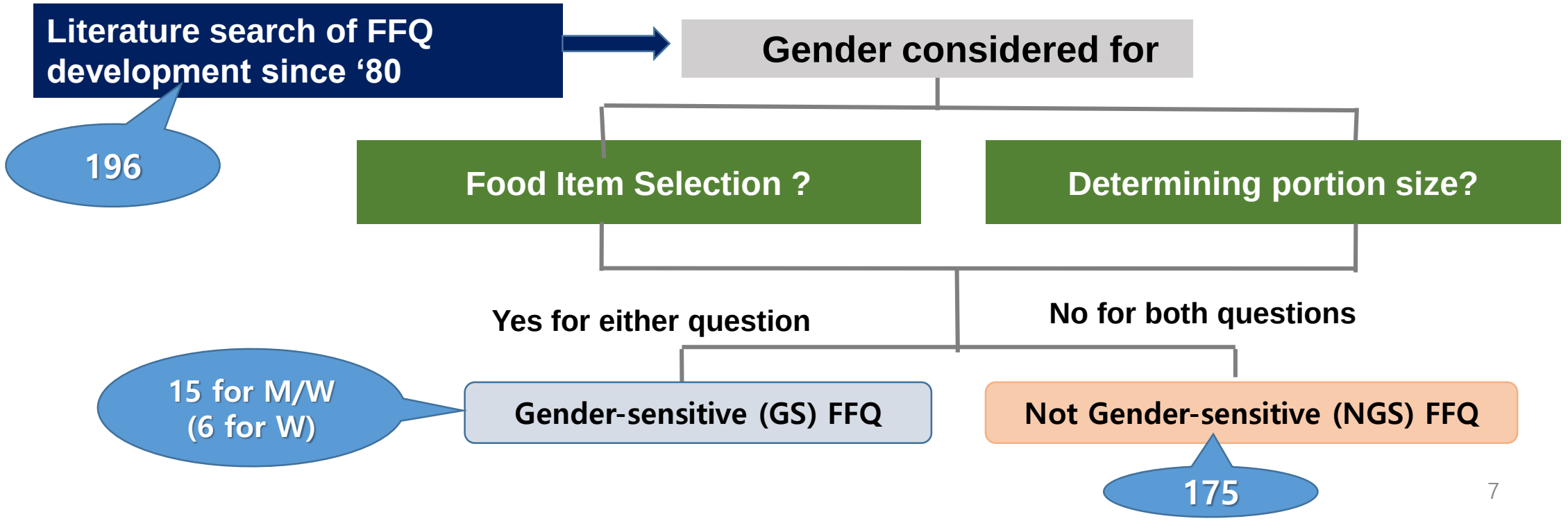
- **Classification of FFQs used in Cohort studies**



- Performance of FFQs of GS vs NGS group in Validation
  - 246 validation studies conducted in adult men and women
    - 45 studies for GS-FFQs, 21 reported results by gender (47%)
    - 201 studies for NGS-FFQs, 69 reported results by gender (44%)
  - Median of [FFQ/reference method] for intakes of 8 nutrients
    - For men, 0.95 in GS group, 1.02 in NGS group
    - For women, 0.93 in GS group, 1.13 in NGS group

    → For NGS group,
      - Ratio higher than in GS group
      - Overestimation of all nutrients in women

- **Any influence on studies on diet-disease relationship?**

Study Objective

To examine whether the associations between diet and diseases are influenced by gender consideration of FFQ

Specifically, comparison of results on red meat and processed meat intakes and CRC risk by gender considerations of FFQs (GS vs. NGS) used in diet assessment in prospective cohort studies

Methods

1. Literature search of prospective cohort studies on CRC and meat intake

Literature search from PubMed studies published up to March 2015 with following terms:

((((colon OR rectal OR rectum OR colorectal OR colorectum)) AND cancer) AND (red meat OR processed meat)) AND (cohort OR prospective) and other sources for

→ 154 studies identified

Studies retrieved from other sources → 8 more studies were identified

Selection of Studies

Selection criteria: (1) Cohort study design was used with adult subjects of both sexes
(2) Relative risk (RR) estimates and the 95% CI of CRC, CC or RC for consumption of **red meat** and/or **processed meat** were provided

→ 14 studies were identified

Classified and analyzed

Methods

2. Classification of studies by FFQs used

3. Meta-analysis of studies

- Meta-analysis of study results for red meat intake
- Meta-analysis of study results for processed meat intake
- To compare the highest and the lowest categories
- Results of **combined subjects** are presented
  (Due to insufficient number of studies by gender)
- Statistical analysis by STATA/SE 13.1 using Random effect model

Result: Meta-analysis of red meat and processed meat intake and colorectal or colon cancer

Dietary Factor	FFQ Group	No. of Studies	RR	95% CI	% Weight
Red Meat	GS	3	1.26	1.15, 1.37	36.58
	NGS	7	1.01	0.92, 1.10	63.42
	Overall	10	1.14	1.01, 1.27	100
Processed Meat	GS	5	1.15	1.04, 1.26	40.68
	NGS	6	1.11	1.02, 1.20	59.32
	Overall	11	1.13	1.05, 1.20	100

Summary

- For diet-disease studies, FFQs are commonly used for diet assessment
- Most of FFQs developed do not consider gender
- Red meat and processed meat are recognized as risk factors of CRC
- In meta-analysis, RR of red meat intake for and colon cancer was significantly only in studies which used GS-FFQs
- For processed meat intake, studies with both GS- and NGS-FFQs showed increased risks
- Our study shows gender consideration of FFQs is important for detecting effects of dietary factors on diseases

Thank you !

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