



Patient Education

Analysis of German nutrition brochures for pregnant women with evidence-based patient information criteria



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ABSTRACT

Objective: To evaluate nutrition brochures for pregnant women in Germany based on evidence-based patient information (EBPI) criteria.

Methods: Nutrition brochures for pregnant women in Germany were collected. Brochures addressing the risk of salmonellosis, toxoplasmosis or listeriosis were analyzed by two researchers independently. **Results:** Fifty brochures reporting any information on the risk of infection were analyzed. Most brochures did not include literature citations and only few brochures gave a risk description, predominantly verbally, which usually leads to an overestimation of the actual risk. Advertisement was present in 22% of the brochures.

Conclusion: German nutrition brochures for pregnant women should be adapted to comply with evidence-based patient information (EBPI) criteria for achieving a better quality of the disseminated information.

Practice implications: The findings highlight the need of high quality nutrition brochures for pregnant women, which are relevant not only for pregnant women, but also to those responsible for creating brochures, and to physicians in charge of patient information.

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1. Introduction

In 2012 approximately 670,000 women in Germany were pregnant [1]. These women are often unsure about how to adapt their nutritional habits regarding an adequate nutrient intake and at the same time preventing food-borne infections. For this reason, evidence-based patient information (EBPI) about an adequate nutrition during pregnancy remains extremely important to diminish the uncertainty most women are experiencing during this time.

There are several nutrition brochures for pregnant women in Germany, but not all of them comply with **evidence-based patient information (EBPI)** criteria, which is a prerequisite for informed patient choice [2]. To comply with the standards of an EBPI, brochures should include clear information based on scientific evidence and consider risk communication as a source of framing

data [2]. The quality of the scientific evidence should be based on patient-relevant outcomes, in which desirable and unwanted effects are to be communicated equally, as well as the lack of evidence [2]. Moreover, including clear results which are easy to understand, i.e. presented as absolute values are important aspects to be included in EBPI brochures [2]. Even if patient information is evidence-based and unbiased, it is important to consider the evidence on the effectiveness of communication tools [3]. For example, there are different formats of communicating risks: as numerical, verbal and visual data [4]. Risk communication is not just to inform consumers, but to change their behavior according to the best available evidence. Therefore, an effective risk communication depends on many factors which should be considered to design patient information adequately [5].

Many nutrition brochures for pregnant women focus on the most relevant food-borne infections during pregnancy, namely salmonellosis, toxoplasmosis or listeriosis. The mother–child transmissions of these pathogens represent an important public health topic. An acute infection during pregnancy may reach the fetus and result in abortion, severe diseases (e.g. neurological disorders) and even death, even if maternal symptoms are mild [6,7]. Due to the fatal consequences of these infections, pregnant

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women are recommended not to consume foods which could transfer the pathogens. Beef, poultry, unpasteurized dairy products, eggs, fruits and vegetables could be infected with *salmonella enterica*, *toxoplasma gondii* or *listeria monocytogenes* and cause maternal infection [8]. It is important to highlight that not all infected food products cause a human infection, and that not all infected pregnant women transmit the pathogen to their fetus. Therefore, the actual risk of fatality during pregnancy is unknown. Nevertheless, most nutrition brochures *restrain* pregnant women from eating foods which could be infected with one of the mentioned pathogens, giving no information about the actual risk behind the given recommendation. Therefore, it remains difficult for pregnant women to estimate their individual risk for certain eating behaviors and an informed choice based on the best available evidence is not achieved.

The objective of the present explorative study was to evaluate the content of nutrition brochures for pregnant women in Germany based on **evidence-based patient information (EBPI) criteria**. This study provides a description about the quality of nutrition brochures for pregnant women in Germany, highlighting potential improvements.

2. Methods

Nutrition brochures for pregnant women were collected between July 2012 and March 2013 with the following inclusion criteria: nutrition brochures or information leaflets for pregnant women; written in German language; printed version or online downloadable version; information regarding risk factors for salmonellosis, toxoplasmosis or listeriosis. Exclusion criteria were: books (including thesis reports) and information on the internet which is not provided as downloadable material.

2.1. Searching for brochures

The search for nutrition brochures included four different methods, which aimed to collect a complete inventory of the current brochures available for pregnant women in Germany:

1. Potential holding organizations, associations (i.e. gynecologists, nutritionists, infectologists and childbirth assistants) and governmental and non-governmental institutions (e.g. public health authorities on state and national level and health insurances) were identified and written enquiries asking for nutrition brochures and information for pregnant women were sent. Stamped and addressed envelopes were enclosed for their reply. Additionally, each identified organization and association was contacted by phone to establish a contact person to follow up on.
2. Brochures and information leaflets were searched in the internet, on the homepage of each of the identified potential organizations, associations or institutions.
3. A random sample of gynecologists in the federal state *Baden-Württemberg* was selected and included into the survey. The Medical Chamber of *Baden-Württemberg* provided a list with all registered gynecologists in the region. A computer random number generator (random.org) was used to take a random sample of 150 gynecologists. Each person of the random sample was asked to provide every nutrition brochure or information normally handed out to their pregnant patients. Stamped addressed envelopes were also enclosed for their reply.
4. Internet search using Google, Yahoo, Google Scholar, BASE, *Forschungsportal* and Scirus was performed with the following search terms: “*Ernährung*” (nutrition); “*essen*” (to eat); “*Schwangerschaft*” (pregnancy). The search strategy is listed under supplementary data. Additionally, the 5 homepages most

visited by pregnant women were identified according to their ranking with alexa.com [9] (see supplementary data for further details). The identified homepages were also searched for further nutrition brochures for pregnant women.

2.2. Data analysis and ethical considerations

Bunge et al. proposed a list of criteria to address the quality of patient information [10]. In order to analyze nutrition brochures for pregnant women, and to comply with our time- and financial limitations, we chose and summarized three main aspects of the proposed **evidence-based patient information (EBPI)** criteria. Data extraction was performed according to the following criteria: (I) the provided information should be based on scientific evidence, (II) results should include a risk description, and (III) meta-information should be clearly stated and disclose any kind of conflict of interests (information should be impartial/neutral). For analyzing scientific evidence (I) and the inclusion of risk description (II), we focused on the most relevant food-borne infections during pregnancy, namely salmonellosis, toxoplasmosis or listeriosis.

- (I) Analysis of scientific evidence: if brochures included literature citation(s) and if yes, the type of citation(s) given (e.g. textbook, expert opinion, study, systematic review). Does the given information represent the current available evidence?
- (II) Inclusion about the risk of salmonellosis, toxoplasmosis or listeriosis during pregnancy: if risk description is included and how is the risk description presented (absolute values/natural frequencies or as absolute or relative risk estimates).
- (III) Declaration of interest (objectivity) as an analysis of meta-information: if brochures contained any kind of advertisement or if a certain product was proposed within the text.

An analysis-sheet was developed for data extraction of the included brochures. All brochures were analyzed by two authors (DK and SL) independent from each other. Before data extraction, the inter-rater reliability was tested on a random sample of the included brochures (10% of analyzed brochures). The results of all brochures were summarized in an excel sheet. For all brochures including risk description and/or advertisement, a descriptive analysis was performed.

3. Results

A total of 88 potential holding organizations, associations and institutions were found and contacted by post and telephone. Seventy seven (87.5%) organizations, associations and institutions gave an answer to our enquiry. Additionally, an internet search of their homepage was performed. One hundred fifty gynecologists in the federal state *Baden-Württemberg* were also asked to provide us with nutrition brochures and leaflets they normally hand out to their pregnant patients. We got a response from 93 gynecologists (62%).

The results of the internet search are summarized in [Table 1](#).

A total of 71 nutrition brochures or leaflets for pregnant women were found with all search methods. Only brochures giving any information on salmonellosis, toxoplasmosis or listeriosis were considered. Therefore, 50 brochures were included into the analysis, which was performed by two authors (DK and SL) independently. The interrater-reliability was tested on 5 brochures and no disagreement between both screeners was found ($\kappa = 1$).

Characteristics of included nutrition brochures according to **evidence-based patient information (EBPI)** criteria

- (I) Analysis of scientific evidence:

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