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GENERAL GYNECOLOGY

What defines a good website of a Department of Obstetrics and Gynecology? A user survey

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Abstract

Purpose The Internet has become a widely used source of healthcare information. Many Departments of Obstetrics and Gynecology use their websites for public relations purposes. It is, however, unclear, what relevant stakeholders such as patients, relatives of patients, physicians, and medical students expect of an Obstetrics and Gynecology Department's website. Therefore, we evaluated the opinions and expectations of the various stakeholders using a structured questionnaire.

Methods We asked gynecologic patients, obstetric patients, relatives of patients, medical students, and physicians to fill in an anonymous questionnaire consisting of general facts about the informant, one open-ended question on expectations and wishes regarding the website, and 28 rating scale questions (7-step visual analog scale ranging from, not important' to, very important') covering the topics "website navigation" (4 questions), "first contact" (3 questions), "clinic processes" (7 questions), "facts and figures about the Department" (4 questions), "visual impressions" (5 questions), and "obstetrics-specific items" (5 questions). Questionnaires for physicians included four additional questions about the value of Department websites as an information tool for themselves and their patients. We used descriptive statistics to analyze the data.

Results 1458 questionnaires were analyzed (gynecologic patients, $n=615$ [42%]; obstetric patients, $n=479$ [33%]; relatives of patients, $n=77$ [5%]; medical students $n=238$ [16%]; physicians, $n=41$ [3%]). The number of circulated questionnaires was not recorded and thus, the response rate is unknown. 1304 (89%) respondents used the Internet as a regular source of health care information, 642 (44%) had previously searched an Obstetrics and Gynecology Department website. All respondents rated contact data and information about processes in the clinic highest; whereas, other issues such as medical facts, visual impressions, and website design issues were significantly less important. Pregnant women rated contact information and obstetric facts highest. 90% of physicians regularly used Department websites for patient referrals and rated contact information and medical team details most important.

Conclusions When designing a website of an Obstetrics and Gynecology Department, contact information and information about processes in the clinic should be displayed most prominently and be easily accessible. Subsections specifically targeted at obstetric patients and physicians should be provided.

Keywords Content · Design · Obstetrics and Gynecology · Quality · Website · World Wide Web

Introduction

The Internet has become a widely used source of information for health issues. In fact, health information is one of the most frequently sought topics on the Internet [1]. In a review of the literature, McMullan et al. found that the majority of health-related Internet searches by patients were for specific medical conditions. These searches were typically carried out before a clinical encounter to decide about the necessity of professional help as well as to seek independent information. Internet searches were also frequent after medical consultations for the purpose of reassurance or because of

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dissatisfaction with the amount of information provided by the professionals. Age is a predictor of Internet use in general and also of health-related Internet use [1, 2]. Young patients specifically engage in the use of electronic media for their health needs. For example, pregnant women routinely use electronic media for many purposes related to health [2]. They are frequent users of websites, social media, and smart phone apps with obstetric contents. In a systematic review of 16 studies, Javanmardi et al. showed that the most important topics of interest for pregnant women were fetal development, symptoms and complications of pregnancy, prenatal tests, nutrition and activities during pregnancy, and stages of delivery. The use of electronic media as a source of pregnancy-related questions has steadily increased over the last years and ranges between 28 and 95% in different countries [3, 4]. For example, 95% of pregnant women used the Internet for accessing health-related information in recent Italian and Swedish studies [4, 5], 93% in Canada [6], and 88% in China [7]. Waring et al. examined pregnant women's interest in using a website or mobile application to help them gain a healthy amount of weight during pregnancy [8]. In this study, interest in electronic information ranged from 67 to 100% across demographics, clinical characteristics, and technology use.

Pregnant women are not the only patient group frequently engaging in health-related Internet use. In a US multicenter study of pelvic floor patients, 75% reported a high Internet use and 42% expressed their desire to use social networking websites to learn about their condition [9]. In this study, age was the most important predictor of Internet and social media use for health purposes. Although less well researched, other groups such as relatives of patients, medical students and physicians also use the Internet to gain a wide range of information related to Obstetrics and Gynecology.

These facts underscore the importance of health-related electronic media in the field of Obstetrics and Gynecology. Thus, a well-designed website is important for any Department of Obstetrics and Gynecology. Although this seems obvious, research on the needs and expectations of relevant stakeholders is scarce. Previously, we found that websites of Departments of Obstetrics and Gynecology are heterogeneous and do not follow a uniform pattern [10]. One reason may be the lack of knowledge about the expectations of patients and other consumers of an Obstetrics and Gynecology website. In accordance with this assumption, we found no articles on user interests and expectations related to websites of Obstetrics and Gynecology Departments in a recent PubMed search (search terms: web site, Obstetrics and Gynecology, web design, quality criteria, user expectations, survey; search date: 07-06-2018). Based on the lack of published evidence on the needs and expectations of consumers of Obstetrics and Gynecology websites, we aimed to evaluate the opinions of these stakeholders using a structured questionnaire.

Materials and methods

Study design and population

We used a questionnaire for delineating the preferences of five specific target audiences, i.e., gynecologic patients, obstetric patients, relatives of patients, medical students, and physicians, regarding an institutional website of a Department of Obstetrics and Gynecology. The questionnaire was a slightly modified version of a questionnaire used previously to assess the quality of websites of Departments of Obstetrics and Gynecology in German-speaking countries [10]. In brief, the design of the original questionnaire had followed a two-step process. In the first step, American Medical Association guidelines [11] and data in the literature [12–16] were discussed by a panel of five web professionals with different areas of expertise and prior experience in the area of medical information-related websites (web programmer, search engine optimization specialist, graphics designer, communication expert), a business psychologist, a medical student, and an Obstetrician/Gynecologist [10]. The structured questionnaire used in the present study (Table 1) consisted of 39 questions (41 for physicians) and was structured as follows: the first part consisted of general questions regarding age, sex, stakeholder group (patient, pregnant woman, relative, medical student, physician), and personal Internet use habits. The second part consisted of an open question related to expectations regarding websites in general and a website of a Department of Obstetrics and Gynecology in particular. The third part consisted of a matrix of 28 rating scale questions using a 7-item semantic differential visual analog scale ranging from 1 ('not important') to 7 ('very important'). These questions covered six subject areas, i.e., "website navigation" (4 questions), "first contact" (3 questions), "clinic processes" (7 questions), "facts about the Department" (4 questions), "visual impressions" (5 questions), and "obstetrics-related items" (5 questions). In addition, questionnaires for physicians included two additional questions in the first part about (1) their use of the Internet in the clinical practice and (2) their use of websites of Departments of Obstetrics and Gynecology for informing their patients, and two additional rating scale questions related to the importance of the team of physicians of the Department of Obstetrics and Gynecology and the importance of the website for patient referrals. Parts 1 and 2 were on the first page (front side when printed double-sided), part 3 on the second page (backside) of the questionnaire. Thus, while not forced or ensured in any way, the open question

Table 1 Study questionnaire

#	Question
1	"You are a …" *Choices:* gynecologic patient; pregnant; relative; medical student; gynecologist/obstetrician[a]; other physician[a]
2	"You are …" *Choices:* male; female
3	"How old are you?"
4	"Do you have Internet access at home?" *Choices:* yes; no
5	"Have you ever searched the Internet for medical topics?" *Choices:* yes; no
6	"Have you ever searched the Internet for pregnancy-related topics?" *Choices:* yes; no
7	"What is your preferred search engine?" *Choices:* Google; Bing; Other (specify)
8	"Have you ever visited our hospital's homepage?" *Choices:* yes; no
9	"Have you ever visited the homepage of hospital's Department of Obstetrics and Gynecology?" *Choices:* yes; no
10	"If so, how did you reach the Department's website?" *Choices:* via the hospital's homepage; via a search engine; directly by inputting the web address; I don't know; Other (specify)
11	"What kind of information do you expect from a homepage of a Department of Obstetrics and Gynecology? Name anything that comes to your mind." *Open-ended question*
12	"How important for you is information regarding …" *Matrix of rating scale questions on page 2 (flip-side) of the questionnaire* *Scale: 1 ("not important") to 7 ("very important")*
Website navigation (N)	
N1	"…clear separation of information for patients and professionals (info domains)?"
N2	"…access to as many topics as possible from a central point (start page, menu)?"
N3	"…Department-specific search function?"
N4	"…clear separation of gynecologic from obstetrics topics?"
First contact (C)	
C1	"…contact details?"
C2	"…how to get to the clinic (individual/public transportation, maps, etc.)?"
C3	"…available parking space?"
Clinic processes (logistics, hospital infrastructure, procedures) (P)	
P1	"…patient registration/admittance procedures?"
P2	"…opening hours, consultation hours, outpatient clinic hours, emergency room hours?"
P3	"…floor maps of the hospital/department?"
P4	"…psychological counseling (availability, opening hours)?"
P5	"…surgical procedures/interventions?"
P6	"…chemotherapy?"
P7	"…radiotherapy?"
Facts and figures about the Department (F)	
F1	"…research and education?"
F2	"…certificates held by the Department?"
F3	"…press releases?"
F4	"…clinical studies?"
Visual impressions (V)	
V1	"How important for you are visual impressions in general?"
V2	"…photos of the team?"
V3	"…images of the hospital?"

Table 1 (continued)

#	Question
V4	"How important for you are embedded videos (e.g. virtual tours)?"
V5	"…virtual tour of the labor and delivery ward?"
Obstetrics-specific topics (O)	
O1	"How important for you is a baby gallery?"
O2	"…topics of interest for expectant mothers?"
O3	"…breast feeding?"
O4	"…midwife care at home?"
O5	"…delivery?"

[a]Questionnaires targeted at physicians differed slightly from those targeted at the other stakeholder groups; see "Materials and methods" section for details

was expected to be answered before the specific rating scale questions.

Between September 2015 and March 2017, nurses at four local institutions (located in Dortmund, Herne, and Witten; Northrhine-Westfalia, Germany), three Departments of Obstetrics and Gynecology and one private practice of Obstetrics and Gynecology, alerted potential candidates to the questionnaire, which was available only in paper form and openly displayed at various locations, usually the waiting areas. In some cases, the questionnaire was handed out directly. Students were alerted to the possibility to fill out the survey during their rotations at the clinics. It was not recorded whether every potential survey taker was aware of the survey at all, whether they took a questionnaire (for themselves or friends and relatives), or whether they returned it (immediately or later), thus precluding the calculation of a response rate. Medical doctors were asked to voluntarily take the survey by one of the authors (Z.H.) at various local meetings and training courses held by our department. All questionnaires were filled in without guidance and completely anonymously.

We sought formal approval from the local Ethics Committee of the Ruhr-Universität Bochum, but were informed that no formal approval was necessary for this study.

Sample size, data management and statistical analysis

The necessary sample size to be representative of the target populations (all women, confidence level of at least 90%, 5% margin of error) was calculated as 270 completed surveys (see e.g. https://www.surveymonkey.com/mp/sample-size-calculator/). Therefore, we aimed to collect at least 270 surveys per group from pregnant women as well as women seeking gynecologic counseling. Additionally, within the collection timeframe, we wanted to obtain as many completed questionnaires as possible from the other respondent groups, but without setting limits regarding these respondents. Returned questionnaires were manually digitalized using Research Electronic Data Capture (REDCap) [17] tools hosted at the Department of Obstetrics and Gynecology, Ruhr-Universität Bochum. We used descriptive statistics to interpret the questionnaire data. Means and medians were used for normally distributed and skewed data, respectively. Excel (Microsoft Corporation, Redmond, WA) and SigmaPlot 14 (Systat Software Inc., San Jose, CA) were used to analyze the data. As we considered all stakeholder groups equally important, we decided to consider a question as important when at least two thirds (66%) of respondents in one or more groups assigned 6 or 7 on the 7-item scale to that question. Line diagrams were used for demonstrating the mean scores per subgroup. ANOVA on ranks was used to compare the distribution of the scores between the subgroups for each question. The open-ended question was analyzed as follows: one person (AH) tokenized all answers. Tokens (terms) represented keywords, concepts, or ideas. The frequencies of the extracted tokens were noted and depicted as word clouds (using Wordle™; http://www.wordle.net) where the font size used for a token was scaled geometrically according to the token's frequency.

Results

1458 questionnaires were collected and analyzed including gynecologic patients, $n=615$ [42%], obstetric patients, $n=479$ [33%], relatives of patients, $n=77$ [5%], medical students $n=238$ [16%], and physicians (28 board-certified obstetricians/ gynecologists and 13 general practitioners), $n=41$ [3%]). As the number of questionnaires handed out (or taken freely) was not recorded (except for physicians, approx. response rate 80%), the overall response rate is unknown. Table 2 shows the personal characteristics of the survey respondents. 1304 (89%) respondents used the Internet as a regular source of health care information, 1072 (73%) had previously visited a hospital website, and 642

Table 2 Characteristics of survey respondents/responses

Characteristic	Value
Total number of surveys received	1458
Age (years)	28 (24–34), range: 14–82 [39 (2.7)]
Sex (female/male/unknown)	1317 (90.3)/138 (9.5)/3 (0.2)
Internet at home? (yes/no/not answered)	1304 (89.4)/51 (3.5)/103 (7.1)
Have used the Internet to research medical topics? (yes/no/not answered)	1304 (89.4)/110 (7.5)/44 (3.6)
Have previously visited hospital homepage? (yes/no/not answered)	1072 (73.5)/369 (25.3)/17 (1.2)
Have previously visited Ob/Gyn subsection? (yes/no/not answered)	642 (44.0)/792 (54.3)/24 (1.6)
Preferred search engine for health-related searches:	[80 (5.5)]
Google	1347 (92.4)
Ecosia	7 (0.5)
Bing	5 (0.3)
Others/not specified	19 (1.3)
Free-text completion rates (Q11)	956 (65.6)/696 (47.7)/545 (37.4)
Average rating scale question completion rate (Q12: N1–O5)	1316.9 (90.3)

Values are *n* (percentage), mean ± standard deviation, or median (interquartile range). Numbers in square brackets indicate the numbers (percentage) of missing values

(44%) had previously searched an Obstetrics and Gynecology Department website. 92% used Google as their preferred search engine, whereas Ecosia (0.5%), Bing (0.3%), and others (1.3%) were only used by a minority of respondents. Table 3 shows characteristics of survey respondents broken down by respondent subgroups, i.e., gynecologic patients, obstetric patients, relatives of patients, medical students, and physicians.

Figure 1 shows bar graphs of all 28 rating scale questions broken down by thematic groups (website navigation, first contact, clinic processes, facts about the Department, visual impressions, and obstetrics-specific items) with the dark bars showing the percentage of respondents rating the question ≥ 6 and the light bars showing the percentage of respondents rating the question ≤ 2. Bars are shown for all respondents and separately for all five subgroups, i.e., gynecologic patients, obstetric patients, relatives of patients, medical students, and physicians. The results demonstrate that all respondents rated contact information and information on procedures (opening hours, maps, parking information, admittance procedures, etc.) highest; whereas medical facts, visual impressions, and website design issues were less important. Pregnant women rated contact information and obstetric facts highest.

To facilitate the comparison between subgroups, we constructed composite line diagrams showing the mean scores for all rating scale questions (Fig. 2). This figure demonstrates that the needs and expectations of all stakeholder groups except for relatives are running in parallel for almost all items suggesting a high degree of agreement among respondents about what is very and what is less important. An exception was relatives who showed different needs regarding "website navigation" (question N2) and "facts about the Department" (questions F1–F4) which were both rated significantly less important compared to the other stakeholder groups. In addition, medical students and physicians had a specific interest in information about academic teaching and science (question F1). Physicians deferred from the other groups in their interest in certifications of the Department (question F2). Lastly, the "baby gallery" (a subsection of the website where, if the parents wish, photographs of newborns and some basic information such as name, birth date, height, weight are displayed publicly) was more important for pregnant women and relatives compared to the other stakeholder groups (question O1).

Figure 3 shows a hit list of the most important questions (defined as questions with a rating of 6 or 7 by $>66\%$ of respondents of at least one of the stakeholder groups). The five most important questions were C1 (contact details), P2 (opening hours, consultation hours, outpatient clinic hours, emergency room hours), O5 (delivery), P5 (surgical procedures and interventions), and O2 (topics of interest for expectant mothers). The five least important questions (defined as the highest percentage of respondents rating the question with a rating of 1 or 2; not shown in Fig. 3) were F3 (press releases), O1 (baby gallery), F4 (clinical studies), V4 (embedded videos), and F1 (research and education).

Figure 4 shows a word cloud of terms extracted from the open-ended question of all 1458 respondents. The font size of individual terms represents the relative weight compared to all other terms. The results of the term analysis show that "range of medical services", "team", and "contact info" have the highest relative weights, which is in agreement with the results from the rating scale questions and underscores the

Table 3 Group-specific characteristics of survey respondents/responses

Characteristic	Patients	Pregnant women	Relatives	Medical students	Doctors
N (%), Total = 1458 [8 (0.5)]	615 (42.2)	479 (32.9)	77 (5.3)	238 (16.3)	41 (2.8)
Age (years)	27 (23–35), R14–82 [8 (1.3)]	31 (27–34), R16–47 [21 (4.4)]	36 (29–54), R19–77 [3 (3.9)]	24 (23–25), R20–44 [6 (2.5)]	45 (34–51), R25–68
Sex	[2 (0.3)]				
Female	611 (99.3)	479 (100.0)	38 (49.5)	153 (64.3)	29 (70.7)
Male	2 (0.3)	0 (0.0)	39 (50.6)	85 (35.7)	12 (29.3)
Use the Internet at home	[12 (2.0)]	[31 (6.5)]	[30 (39.0)]	[30 (12.6)]	
Yes	574 (93.3)	433 (90.4)	42 (54.5)	207 (87.0)	41 (100.0)
No	29 (4.7)	15 (3.1)	5 (6.5)	1 (0.4)	0 (0.0)
Use the Internet in the practice					[1 (2.4)]
Yes	–	–	–	–	39 (95.2)
No	–	–	–	–	1 (2.4)
Have researched medical topics on the Internet?	[3 (0.5)]				
Yes	552 (89.8)	442 (92.3)	67 (87.0)	238 (100.0)	–
No	60 (9.8)	37 (7.7)	10 (13.0)	0 (0.0)	–
Have researched pregnancy-related topics?	[5 (0.8)]	[1 (0.2)]		[5 (2.1)]	
Yes	256 (41.6)	460 (96.0)	50 (64.9)	156 (65.5)	–
No	354 (57.6)	18 (3.8)	27 (35.1)	77 (32.4)	–
Have previously visited the hospital website?	[9 (1.5)]		[2 (2.6)]	[2 (0.8)]	[4 (9.8)]
Yes	351 (57.1)	429 (89.6)	52 (67.5)	206 (86.6)	29 (70.7)
No	255 (41.5)	50 (10.4)	23 (29.9)	30 (12.6)	8 (19.5)
Have previously visited the Ob/Gyn subsection?	[15 (2.4)]	[2 (0.4)]	[2 (2.6)]	[2 (0.8)]	[3 (7.3)]
Yes	141 (22.9)	353 (73.7)	30 (39.0)	89 (37.4)	26 (63.4)
No	459 (74.6)	124 (25.9)	45 (58.4)	147 (61.8)	12 (29.3)
Average free-text completion rate (Q11)	317.7 (51.7)	206.7 (43.1)	28.7 (37.2)	152.7 (64.1)	25.0 (61.0)
Average rating scale question completion rate (Q12: N1–O5)	528.0 (85.8)	437.4 (91.3)	69.4 (90.1)	235.2 (98.8)	39.8 (97.2)

Values are *n* (percentage), mean ± standard deviation, or median (interquartile range). *R*, range. Percentages across row for *N*, otherwise across columns. Numbers in square brackets indicate the numbers (percentage) of missing values

necessity to provide team-specific data and data on medical services offered by the Department. Word clouds specific for all five stakeholder groups (patients, pregnant women, relatives of patients, medical students, and doctors) are shown in Supplementary Figure 2.

Discussion

The Internet has become an important means of communication for any Department of Obstetrics and Gynecology. The Department's website is, therefore, an integral part of the communication with patients as well as other relevant stakeholders. It is of note that only a few scientific papers have discussed criteria for an optimal website design and the necessary contents of such a website [10]. Moreover, there are no data available describing the specific needs and expectations of individual groups targeted by an Obstetrics and Gynecology website. To address this knowledge gap in an important field of medical communication, we have systematically evaluated the opinions of gynecologic patients, obstetric patients, relatives of such patients, medical students, and physicians using a structured questionnaire. We found that contact data and information about processes in the clinic have the highest priority for all groups of respondents; whereas medical facts, visual impressions, and website design issues are significantly less important. Moreover, as expected, specific groups of respondents have specific needs. For example, pregnant women rated contact information and obstetric facts highest; whereas, physicians rated contact

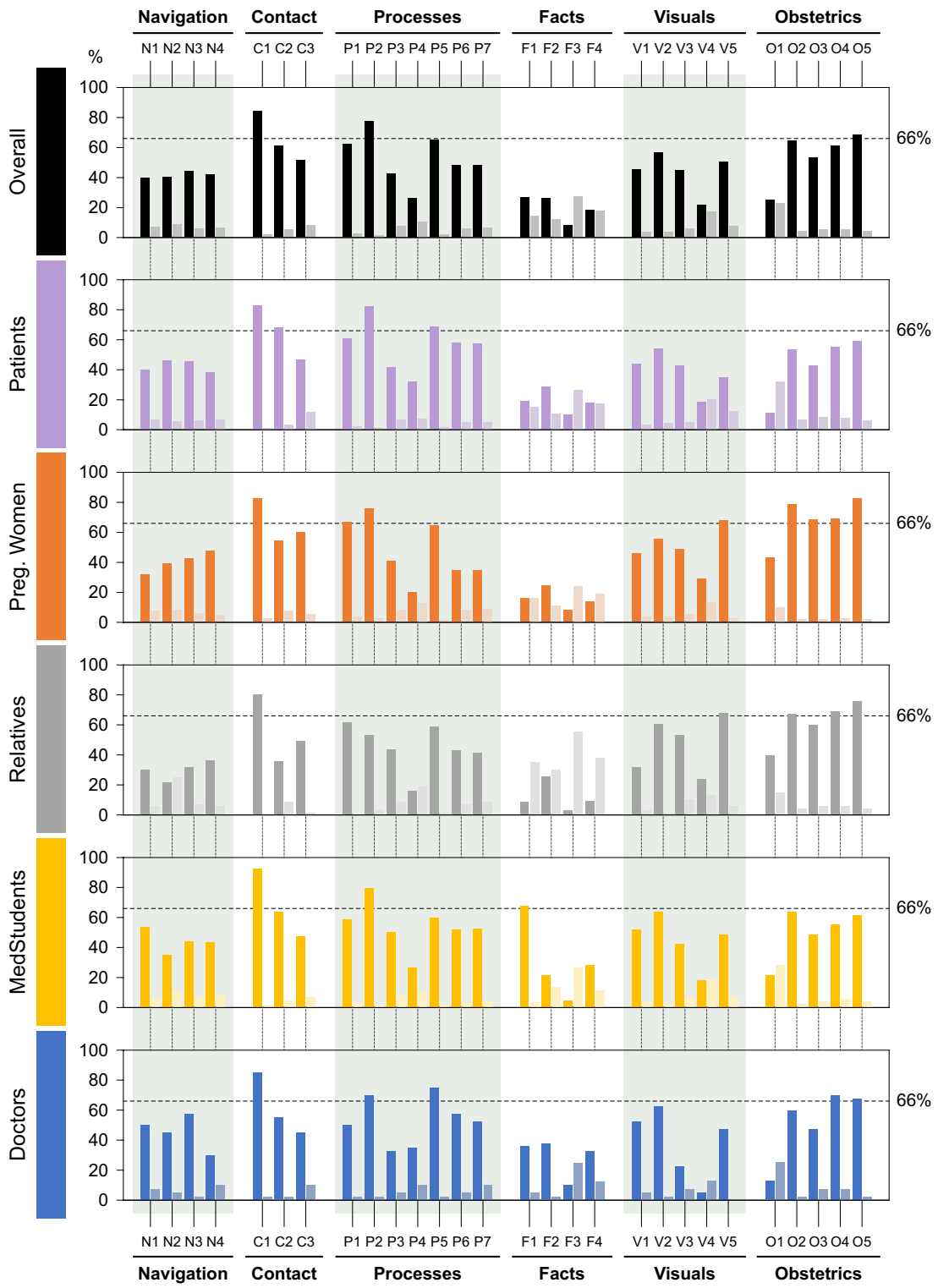

Fig. 1 Bar charts showing the proportions of survey respondents (overall and individual stakeholder groups—see legend within the figure) who rated the rating scale questions (see Table 1) with 6 or 7 (darker bars) or 1 or 2 (lighter bars)

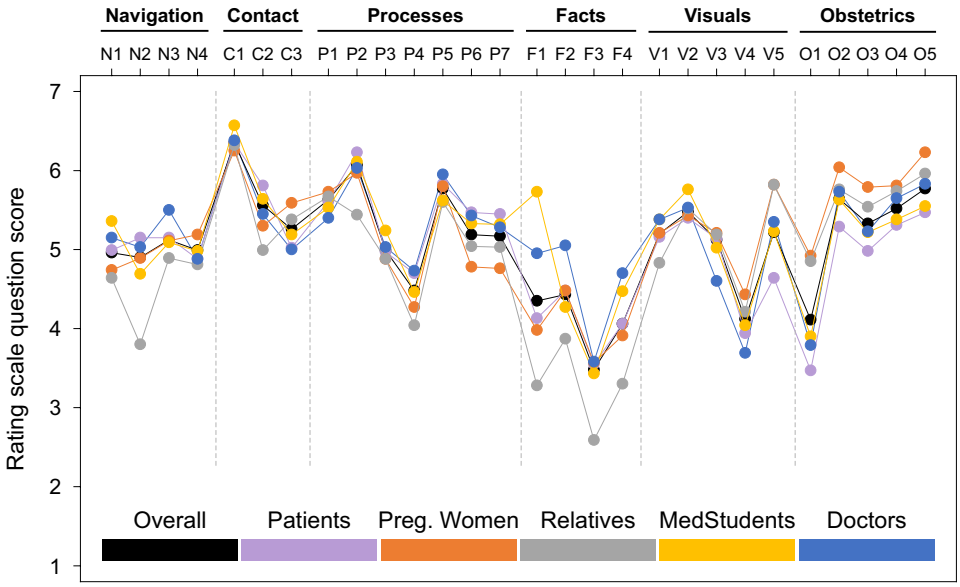

Fig. 2 Line diagrams showing the mean scores of the rating scale questions (rated overall and by individual stakeholder groups—see legend within the figure). Scale: 1, 'not important'; 7, 'very important'. Lines between dots are shown to facilitate following an individual subgroup

information, range of medical services, and details on the medical team most important.

In our study, 89% of respondents used the Internet as a regular source of health care information. This confirms the importance of electronic media for access to health information and is in accordance with previous data in the international literature reporting that between 88 and 95% of pregnant women use the Internet for accessing health-related information [4–7]. This supports the external validity of our study for countries and settings with a high degree of Internet use in daily life.

Gynecologic and obstetric patients are the most important target group for any website of a Department of Obstetrics and Gynecology. Based on the results of our study for this subgroup of respondents, we propose that a website should offer a subsection for patients with a prominent and easily accessible section on contact details and information on processes in and around the clinic such as opening hours, maps, parking information, admittance procedures, etc. As demonstrated by the word cloud analyses, gynecologic and obstetric patients differed in their ratings. Thus, a subsection for gynecologic patients should contain information on the range of medical services, examinations and treatments, and team members; whereas, a subsection for pregnant women should contain specific information on pregnancy and delivery and the obstetric team. In addition, this group prioritized visual material such as virtual tours, educational and information videos, and images of the obstetric team.

Physicians are an important stakeholder group for any Department of Obstetrics and Gynecology. This group is crucial for a successful referral structure and, thus, plays an important role in the continuing success of the Department. Therefore, the Department website should be appropriately designed to accommodate the expectations and needs of this stakeholder group. We found that 90% of physicians regularly used Department websites for patient referrals demonstrating that the website is an ideal means of communicating with this group. Furthermore, our study helps to understand what a website should offer to physicians, namely precise and easily accessible contact information and details about the medical team. In the word cloud analysis, physicians were also very interested in information about the range of medical services and specializations offered by the Department. Taken together, our data suggest that any website of a Department of Obstetrics and Gynecology should have a subsection for physicians containing (1) contact details, (2) specifics of the individual medical staff members, and (3) a list of medical services offered by the Department.

Our study has strengths and weaknesses. Of note, we have performed the first study addressing this issue and the number of respondents is high with > 1000 questionnaires. Also, we have not only collected data on the needs and expectations of the most important audience, i.e., gynecologic and obstetric patients, but also on other relevant stakeholder groups with a genuine interest in Obstetrics and Gynecology such as relatives of patients, medical students, and physicians. This allows for a general view on all groups of potential addressees of a Department website in this specific field of Medicine. The internal validity of our study may be hampered by the subjective nature of the questions, which were formulated by a group of medical and communications experts. Other panels may have chosen other questions and thus our spectrum of information may reflect not only the respondents' views, but also the views and backgrounds of the expert panel. However, by designing a large questionnaire with 28 rating scale questions, and including an open-ended question regarding the respondents' expectations (question 11) before the structured part, we have tried

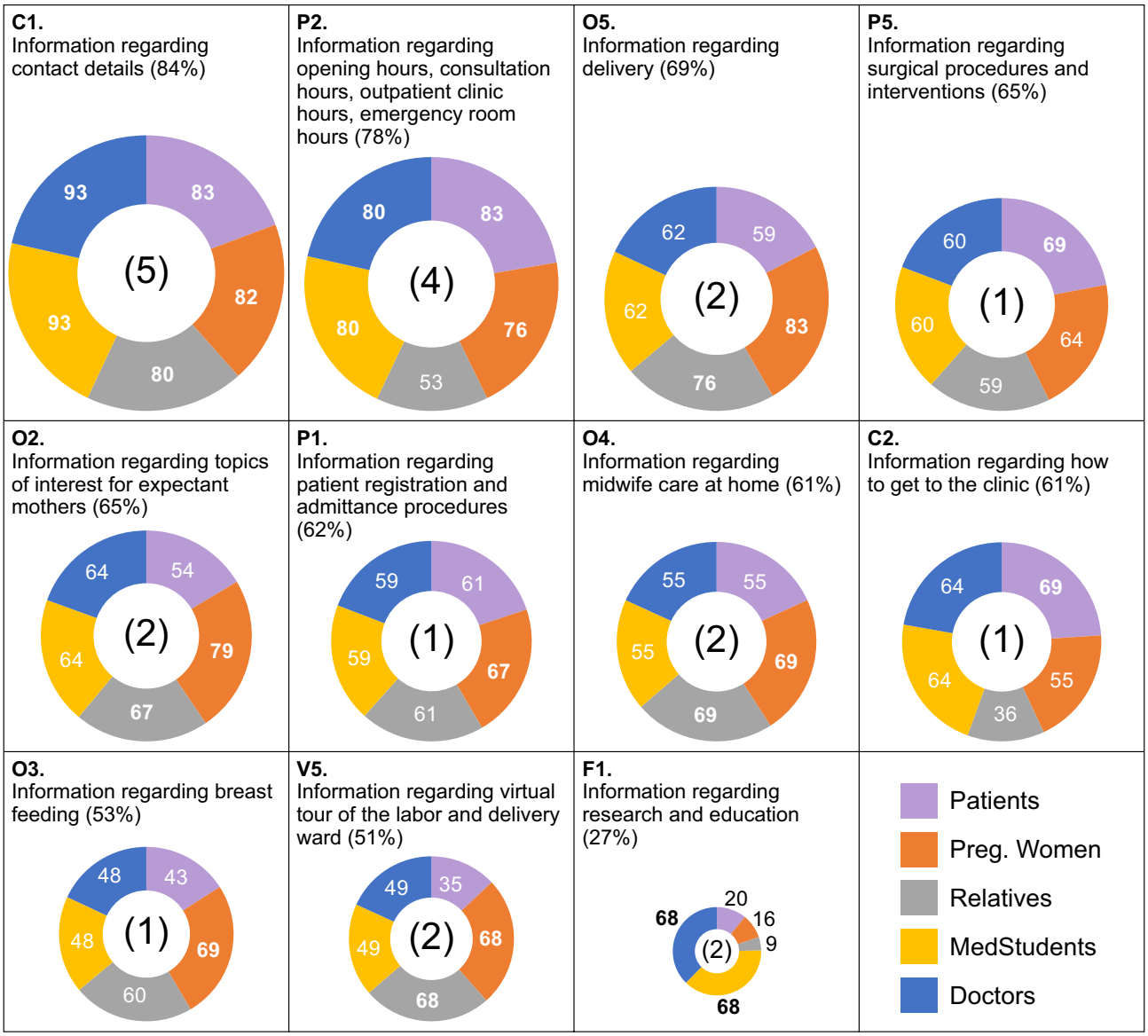

Fig. 3 Donut diagrams of the topics covered by the rating scale questions that were rated important (i.e., > 66% of respondents in at least one stakeholder group rated this topic with a score of 6 or 7), ordered by decreasing overall importance (from top left to bottom right). The donut diameter corresponds to the proportion of all respondents who rated the topic important (see Fig. 1, panel "Overall"; the percentage is given at the end of the text in each box). Lengths of the ring segments correspond to this same proportion for each stakeholder group (percentages noted inside; values > 66% are shown in bold and the count of stakeholder groups with values above this threshold is denoted in the center)

to minimize this problem. In addition, all respondents filled in the questionnaires in a clinic, i.e., after they have found their way to a Department of Obstetrics and Gynecology. Thus, their views may not necessarily represent a general population view. People without any relation to Obstetrics and Gynecology may have different needs and expectations when they seek health care information via such a website. This has to be acknowledged when interpreting the results of our study. Due to the factors mentioned in "Materials and methods" and "Results" section, we are unable to provide survey response rates. However, we do not see this as a significant drawback of this study as the number of evaluated questionnaires in the key target groups was large enough to constitute a representative sample.

In summary, we performed a questionnaire survey about the needs and expectations of different groups of stakeholders interested in a website of a Department of Obstetrics and Gynecology. We found that contact information and information about processes in the clinic are the most important items. Subsections targeted at specific groups should be

Fig. 4 Word cloud showing the relative frequency of terms extracted from the open-ended questions ("What kind of information do you expect from a website of a Department of Obstetrics and Gynecology? Name anything that comes to your mind."), using a square-root scale, of all survey respondents (i.e. all stakeholder groups combined)

provided. Pregnant women rated contact information and obstetric facts highest. Physicians rated contact information, range of services, and medical team details most important.

Author contribution GA Rezniczek: Protocol Development, Data Analysis, Manuscript Writing. Z Hilal: Data Collection, Manuscript Writing. A Helal: Data Management, Manuscript Editing. S Schiermeier: Data Collection, Manuscript Editing. CB Tempfer: Protocol Development, Data Collection, Manuscript Writing.

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Compliance with ethical standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical approval Formal approval from the local Ethics Committee of the Ruhr-Universität Bochum was sought but not deemed necessary for this study.

Data availability Original data generated and analyzed during this study are available from the corresponding author on reasonable request.

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