
Information needs of pregnant women – once-off needs and needs for information monitoring revealed by the McKenzie two dimensional model

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Abstract

Maternal and infant mortality rates in African countries can be reduced through provision of reliable health information to pregnant women. This article reports on an exploratory study that investigated the information needs of pregnant women for information monitoring. Many information needs that occur once-off such as medication, diets and supplements, and genetic counselling were also revealed. The study applied an explanatory sequential mixed methods design. Data were collected between August and October 2015 with a questionnaire from 37 respondents of whom eleven also participated in individual face-to-face interviews. Information monitoring can assist with meeting needs for information on an ongoing basis.

Keywords: Health information, information needs, information monitoring, pregnant women

Introduction

Pregnant women offer a rich context for gaining better understanding of information behaviour and especially information needs (McKenzie 2004: 686). Studies have established that they experience many unmet information needs during pregnancy (Song, Cramer, McRoy, and May 2013). Browner and Press (1997: 117) suggest that receiving and providing information is an important aspect of North American prenatal care and information seeking by pregnant women is a normal phenomenon during pregnancy. In spite of work done on information provision to pregnant women and their information needs (Moosa and Gibbs 2014; Al-Ateeq and Al-Rusaies 2015), there are still many gaps. This article reports on an explanatory sequential design mixed methods research study conducted by Akanbi (2016) on information monitoring and current awareness services supporting the information behaviour of pregnant women. Data were collected between August and October 2015 in a more affluent part of Pretoria, South Africa with pregnant women who visited two medical practices of gynaecologists respectively. This article specifically addresses the question: What are the information needs of pregnant women for information monitoring?

Clarification of concepts

Information needs can be referred to as an incomplete state of knowledge (Staiman and Mizzaro 1998) or anomalous state of knowledge (ASK) (Belkin, Oddy and Brooks 1982). Individuals, particularly pregnant women, may sometimes find it difficult to express an information need because they do not recognise it as a secondary need (Wilson 1999: 250); they focus only on the primary need such as staying healthy or planning the delivery. Taylor (1968) addresses these difficulties in an article classifying expressions of information need into four categories, namely, visceral, conscious, formalised and compromised needs (the details of these categories of information needs will not be explained in this article). Information needs can be once-off, for example, for factual information or for information published over a period of time such as for retrospective information seeking. Some of these information needs may occur again at a later stage such as when a situation changes. In contrast, there are information needs requiring that information is provided on an ongoing and regular basis, that is, requiring information monitoring. Information monitoring is the process of keeping track of newly available information on various online platforms such as websites and webpages, databases, journals, magazines, blogs, newsletters and discussion lists (Akanbi 2016: 6). Hence, information monitoring has the capacity to keep its recipients, pregnant women included, abreast of new information as well as meeting their

information needs. Current awareness services (CAS), alerting services and selective dissemination of information (SDI) are library services for meeting the information needs of its recipients for information they prefer to monitor on a regular basis. Although these terms are often used interchangeably there are slight differences between them (Fourie 2006). This article refers to information monitoring. Current awareness services and selective dissemination of information were traditionally offered by libraries. The Web and social media platforms, however, have opened many possibilities for people to set up their own information monitoring services (Fourie 2006).

Information needs may be divided into both expressed and unexpressed information needs (Shenton 2007; Fourie 2012), evident when a person is aware or unaware of a need for information (Taylor 1968; Wilson 1999). Unexpressed information needs occur when someone is not aware of the fact that information is needed in a particular circumstance or when somebody decides not to act on his or her needs (Shenton 2007). Conversely, expressed information needs occur when an individual is aware that there is a need to fill a gap in the state of his or her knowledge (Volpe 2010). An unexpressed information need refers to ignoring the information need by not searching for information; it becomes an expressed information need when action is taken to meet the information need (Shenton 2007). Pregnant women have both expressed and unexpressed information needs. The unexpressed needs can be triggered or exposed through browsing and information monitoring. McKenzie (2002) and Pettigrew (1997) have noted various kinds of information behaviour that occur when pregnant women spend time in medical clinics for their prenatal check-ups, for example, actively asking for information, soliciting for new information and making referrals and appointments.

The reality of pregnancy and healthcare in South Africa

The overall outcome of pregnancy determines the future of any society (Lau et al. 2014). However, the rate of maternal mortality and perinatal loss in Africa, including South Africa, has been on the increase (Jaldesa 2014). As context to a study on the information needs of pregnant women, the quality of healthcare, mortality rates, HIV/AIDS and treatment, comorbidities with other diseases and conditions, social issues, awareness and need for care for pregnant women in South Africa must be noted in addition to the information needs of pregnant women as reported in the subject literature. The available literature focuses mostly on problems experienced in rural areas and poorer communities. This article can serve as an impetus to take the study findings it reports on to women in poorer communities where internet access through mobile devices has rapidly improved (Cormick et al. 2012; Lau et al. 2014).

Quality of healthcare for pregnant women in South Africa

Healthcare centres have the central responsibility of providing both pre- and postnatal care for pregnant women (Openshaw, Bomela and Pretlove 2011; Lau et al. 2014). Poor quality of healthcare has been recognised in recent studies as one of the key causes of increased maternal deaths in South Africa (Haskins, Phakathi, Grant, and Horwood 2014). Skilled midwives and doctors are fundamental elements in healthcare delivery to pregnant women (Lucas, Charlton and Yeatman 2014). Inadequacy in healthcare human resources is causing increased staff burn-out, absenteeism, low productivity and inadequate provision of care, particularly to pregnant women (Haskins et al. 2014). Unethical behaviour and attitudes have been identified among South African healthcare providers (Silal, Penn-Kekana, Harris, Birch, and McIntyre 2012; Haskins et al. 2014), including hostile patient-provider relationships, concerns about the attitudes of healthcare providers, insufficient capacity to handle large numbers of patients, and poor communication with patients.

Insufficient healthcare services are a prominent setback facing pregnant women in South Africa (Mayosi and Benatar 2014). There is an unequal distribution of healthcare centres in the different provinces in South Africa that especially affects pregnant women living in remote areas and who rely on poor transportation facilities (Schoon 2013; Wesolowski et al. 2015).

Mortality rates among pregnant women

The maternal mortality rates for South Africa are relatively high (Tsai et al. 2014). In 2007, it was 625 deaths per 100 000 live births (Silal et al. 2012), while De Wet and Ngubane (2014) confirm an estimate of 350 000 deaths among sub-Saharan pregnant women annually. Unsafe abortion is also a major cause of high maternal mortality in South Africa (Jacobs and Hornsby 2014). Maternal mortality and unsafe abortion can be reduced by adequate provision of relevant health information.

Pregnancy, HIV/AIDS and treatment

Studies on HIV/AIDS have reported a rise in the number of pregnant women living with HIV in South Africa, adding pressure to the South African healthcare system (Myer, Zulliger, Black, Pienaar, and Bekker 2012). Free access to antiretroviral treatment (ART) at healthcare facilities can, however, cater for the needs of pregnant women living with HIV/AIDS (Barron et al. 2013). In 2012 the national Department of Health (South Africa, Department of Health 2012) confirmed an estimation of about 30.2% of pregnant women in South Africa living with HIV/AIDS among those who visited public healthcare

facilities in 2010. Barron et al. (2013) and Johnson (2012) predicted that South Africa would have three million pregnant women living with HIV/AIDS in spite of ART. Some pregnant women are also negligent in taking ART (Clouse et al. 2013). Fear of stigmatisation from members of society, poor income and the possibility of relocating to another place during pregnancy are some of the identified reasons why they drop out of ART (Wang et al. 2011).

Pregnancy and comorbidity with other diseases and conditions

Non-communicable and communicable diseases are emerging rapidly in South Africa, particularly among the poor as well as pregnant women, thereby causing increased maternal and infant mortality (Abegunde, Mathers, Adam, Ortegón, and Strong 2007). Non-communicable diseases include cardiovascular diseases, cancer, diabetes and respiratory diseases (Abegunde et al. 2007).

Communicable diseases include tuberculosis, malaria, cholera and measles (Mathad and Gupta 2012; Singh, Brown and Rogerson 2013). Cardiovascular diseases among pregnant women are one of the leading causes of maternal mortality, both in developing and developed countries (Watkins, Sebitloane, Engel, and Mayosi 2012). Furthermore, 196 of 225 were reported to have prepartum heart failure or symptoms of cardiovascular diseases and thirty postpartum heart failure or related symptoms in a study by Sliwa et al. (2014). Clearly, pregnant women are at very high risk of losing their developing fetuses or their own lives when faced with all these challenges (Watkins et al. 2012; Beauclair, Petro and Myer 2014). Hypertension, anaemia, malaria and tuberculosis among pregnant women also cause serious health problems, stillbirths and complications during pregnancy (World Health Organisation 2011; Tsoka-Gwegweni and Kleinschmidt 2013; Beauclair, Petro and Myer 2014; Zumla, Bates and Mwaba 2014).

Impact of social issues on pregnant women

South Africa is a developing country with high incidences of unwanted teenage pregnancies and of rape (Vries et al. 2014). The South African government offers child support grants to teenage mothers (Udjo 2014). Teenage pregnancies are on the rise in both developing and developed nations generally (Mushwana, Monareng, Richter, and Muller 2015).

Violence and abuse are an integral part of South African society, especially towards women (Durevall and Lindskog 2015). South Africa is known to be among the countries with the highest rates of foetal alcohol syndrome in the world (Eaton et al. 2014). Pregnancy sometimes affects the psychosocial well-being of pregnant women because it can bring increased levels of anxiety, stress

and fear (Tsai et al. 2014; Hutti, Armstrong, Myers, and Hall 2015). Anxiety, especially during pregnancy has been associated with negative health outcomes, which affect both the mother and the foetus (Brunton, Dryer, Saliba, and Kohlhoff 2015). Hence, to overcome pregnancy-related disorders, communal prenatal care is advised (Openshaw, Bomela and Pretlove 2011). Creation of awareness among pregnant women is essential in order to combat some of the challenges they face, as discussed in previous sections. The last sub-section deals with women's awareness of facilities and need for care.

Women's awareness of facilities and need for care

Stimulation of awareness of healthcare services and facilities is a necessity at present because of the shift towards a more patient-centred healthcare sector (Adanikin, Onwudiegwu and Akintayo 2014). Patients must be more involved in decisions about their health (Johnson and Case 2012; Dalrymple, Roger, Zach, Turner, and Green 2013), and thus, health literacy for pregnant women cannot be over-emphasised (Korda and Itani 2013). Some studies on pregnant women reported inadequate awareness among them regarding the benefits of prenatal care (Myer and Harrison 2003; Das and Sarkar 2014). Wennberg, Lundqvist, Hogberg, Sandstrom, and Hamberg's (2013) study on women's experiences of dietary advice during pregnancy found that they perceived the advice and information they were given as contradictory and unreliable. Lack of awareness of obstetric danger signals has been noted among pregnant woman in Africa (Beauclair, Petro and Myer 2014). Breastfeeding education has been recognised as beneficial (Faber, Laubscher and Berti 2014; Tuthill, Chan and Butler 2015).

Based on the above background on the literature on healthcare and pregnancy specifically in South Africa, it has been noted that pregnancy brings about physical and psychological changes in women (Hutti et al. 2015) and triggers a need for pregnancy-related information in order to adjust to the physical and psychological changes (Das and Sarkar 2014). Case (2012) and Johnson and Case (2012) suggest that healthcare providers such as doctors, nurses and midwives are of great importance in providing health information to pregnant women and other members of the public.

Information needs of pregnant women

Literature on pregnant women has shown that they have information needs regarding nutrition (Arrish, Yeatman and Williamson 2014; Legault and Marquis 2014), family planning (McKenzie 2006), total well-being of the foetus (Gao, Larsson and Luo 2013; Wennberg, Hornsten and Hamberg 2015),

medication (Hameen-Anttila et al. 2015), pre- and postnatal care (Openshaw, Bomela and Pretlove 2011; Finlayson and Downe 2013), breastfeeding (Mekuria and Edris 2015; Tuthill, Chan and Butler 2015), health policies (Amaoh and Appiah-Sakyi 2013), birth facilities (Finlayson and Downe 2013), support against abuse (Groves et al. 2015), obstetric danger signals (Hutti et al. 2015), healthy lifestyles (Herbec et al. 2014), foetal movements (McArdle, Flenady, Toohill, Gambl, and Creedy 2015) and stress management (Thomas, Komoti and Judd 2014). Information on employment opportunities and access to government infrastructure is also of concern for pregnant women (Harrison 2009).

Some factors have been found to influence the information needs of pregnant women. Chomat, Solomons, Montenegro, Crowley, and Bermudez (2014) and Das and Sarkar (2014) identified economic, educational, marital and health issues as important elements in meeting their information needs. In addition, Hsieh and Brennan (2005) found that the state of health and age of pregnant women influence their information needs.

Expressed and unexpressed information needs can be noted from Singhal, Chattopadhyay, Garcia, Adams, and Cheng (2014) reporting on dental health information relevant to pregnant women. Singhal et al (2014) investigated prenatal dental care information needs and oral health information among 4 537 mothers living in Maryland, United States of America (USA) who had survived live births between 2001 and 2003. The result from the study showed that 48% of the women visited a dentist during pregnancy and 25% reported information needs regarding dental care, while 33% did not visit a dentist despite the need for information.

From the literature it appears that pregnant women also have some personal information needs, for example, on support against abuse, smoking and family problems (Russell, Eaton and Petersen-Williams 2013; Groves et al. 2015). Healthcare providers in maternity care can do little about personal problems (Fenwick, Toohill, Creedy, Smith, and Gamble 2015), but access to information from other resources might be useful (Grimes, Forster and Newton 2014).

A study by Cormick et al. (2012) at Rosario and Mercedes, Argentina involved 147 pregnant women. The study explored questions regarding the women's interest in receiving prenatal information during pregnancy through text messages on their mobile phones. An estimated 96% of the pregnant women indicated receiving mobile text messages during pregnancy and 91% acknowledged receiving text messages after the pregnancy. During pregnancy 87% of the women showed interest in receiving phone calls on pre- and

postnatal health information. Generally, 90% of the pregnant women needed information on prenatal information, 91% needed information on foetal development and health, 92% needed information on exercise, nutrition and preventive recommendations, 91% needed information on when it is time to give the doctor a phone call, 91% needed information on breastfeeding and 95% needed information on the baby’s skin care. Information needs that ranked lowest among the pregnant women were information on exercise and methods of delivery, 73% and 64% respectively.

From the literature the two dimensional mode of information practices model of McKenzie (2003: 26) stood out. The model identified four modes of information practices from McKenzie’s participants, 19 pregnant women carrying twins. McKenzie identified four modes of information practice: active seeking, active scanning, non-directed monitoring and proxy information seeking. For purposes of this article active scanning and non-directed monitoring were especially important. The model is shown in Figure 1.

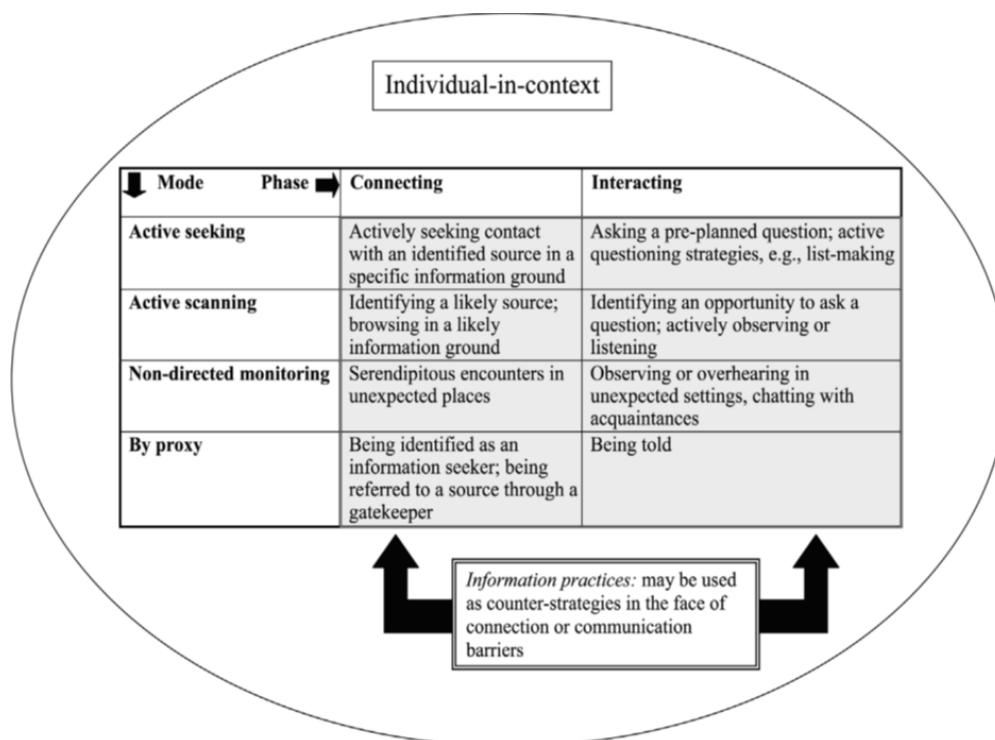


Figure 1: McKenzie’s two-dimensional model of information practices (2003: 26)

Method

An explanatory sequential mixed methods design was adopted for this study; it entails the use of a method to collect quantitative data and then a method to collect qualitative data; a qualitative method was used for providing in-depth

understanding and explanation of the findings from the quantitative data (Creswell 2014; Leedy and Ormrod 2014: 276).

The empirical data were collected over a period of three months (August to October 2015) after ethical clearance was obtained from the research committees of two faculties at the University of Pretoria: Engineering, Built Environment and Information Technology (EBIT), and Health Sciences.

Empirical data were gathered by using a self-administered questionnaire distributed to 40 pregnant women during their routine check-ups at two private medical practices of gynaecologists in Pretoria, South Africa. Only 37 of the returned copies of the questionnaire could be used. Interviews were also conducted with eleven of the respondents. The questionnaire and interview schedule were developed from the literature review and the McKenzie model (Figure 1); the model allowed for all four modes of information seeking, although the study's main focus was on information monitoring.

The participants were present at the sites located in two more affluent areas in an urban area, Pretoria, South Africa, based on appointments with their gynaecologists. Both gynaecologists gave permission to approach their patients and all participants in the study completed and signed a form of informed consent prior to completion of the questionnaire, as well as for giving permission for the interviews to be recorded. The participant profile is depicted in Table 1. For the purpose of recording responses and reporting feedback, participants were numbered as P (e.g. P1, P2).

Table 1: Profile of the participants

Parti- cipants	Pregnancy stage	Preg- nancies	Marital status	Level of education	Prenatal visits	Reasons for visits
P1	11-20 weeks	4	Married	Grade 12	-	Routine check-up
P2	31-40 weeks	1	Married	Bachelor	More than 6	Routine check-up
P3	31-40 weeks	1	Single	Bachelor	More than 6	Routine check-up
P4	21-30 weeks	2	Married	Honours	More than 6	Routine check-up
P5	31-40 weeks	3	Single	Diploma	3	Routine check-up
P6	21-30 weeks	4	Married	Honours	More than 6	Routine check-up
Parti- cipants	Pregnancy stage	Preg- nancies	Marital status	Level of education	Prenatal visits	Reasons for visits
P7	11-20 weeks	-	Boyfriend	Grade 12	3	Routine check-up
P8	21-30 weeks	4	Married	Diploma	4	Routine check-up
P9	21-30 weeks	3	Single	Diploma	4	Routine check-up
P10	21-30 weeks	1	Married	Diploma	More than 6	Routine check-up
P11	31-40 weeks	3	Single	Grade 12	More than 6	Routine check-up
P12	31-40 weeks	3	Married	Grade 12	More than 6	Routine check-up
P13	31-40 weeks	3	Married	Grade 12	4	Routine check-up
P14	11-20 weeks	1	Married	Grade 12	More than 6	Routine check-up
P15	Over 40 weeks	1	Married	Grade 12	-	Routine check-up
P16	11-20 weeks	2	Married	Diploma	4	Routine check-up
P17	11-20 weeks	2	Married	Bachelor	3	Routine check-up
P18	21-30 weeks	2	Married	Diploma	5	Routine check-up
P19	31-40 weeks	1	Married	Bachelor	More than 6	Routine check-up
P20	Over 40 weeks	4	Divorced	Masters	More than 6	Routine check-up
P21	31-40 weeks	4	Married	Diploma	5	Routine check-up
P22	21-30 weeks	4	Married	Masters	3	Routine check-up
P23	31-40 weeks	4	Married	Grade 12	5	Routine check-up Obstetrics danger signs
P24	31-40 weeks	2	Married	Bachelor	More than 6	Routine check-up
P25	21-30 weeks	1	Married	Bachelor	4	Routine check-up
P26	31-40 weeks	3	Married	Grade 12	More than 6	Routine check-up
P27	11-20 weeks	1	Married	Grade 12	3	Routine check-up
P28	11-20 weeks	2	Married	Grade 12	4	Routine check-up
P29	21-30 weeks	1	Married	Honours	4	Routine check-up
P30	31-40 weeks	3	Married	Other	More than 6	Routine check-up
P31	31-40 weeks	2	Married	Honours	6	Routine check-up
P32	31-40 weeks	1	Single	Grade 12	More than 6	Routine check-up
P33	1-10 weeks	4	Married	Honours	1	Routine check-up
P34	1-10 weeks	2	Married	Masters	1	Routine check-up
P35	11-20 weeks	4	Married	Grade 12	2	Routine check-up
P36	31-40 weeks	3	Single	Diploma	More than 6	Routine check-up
P37	21-30 weeks	4	Married	Bachelor	6	Routine check-up
P38	21-30 weeks	2	Single	Grade 12	More than 6	Routine check-up
P39	31-40 weeks	1	Single	Not completed grade 12	6	Routine check-up
P40	31-40 weeks	1	Single	Diploma	6	Routine check-up

Findings and analysis from the questionnaire

This section summarises findings on the participants' needs for information. Women had to rate their needs for information on prior selected topics (Table 2), but there was also opportunity through open questions to note additional information needs. The first author ensured that a brief explanation of the concept of information monitoring was provided to the participants before asking the women about their information needs in general and especially needs to monitor information on selected issues. All questions applied to information needs experienced during the women's current pregnancy and the information needs they expected for the period immediately after giving birth.

Perceptions of needs for information on selected issues during the current pregnancy

Fifteen issues were presented as information needs, not limited to information that needs to be monitored – these could be once-off or re-occurring information needs – all related to active information seeking in Figure 1. The issues were based on findings from the literature review (Akanbi 2016). Only one participant noted an additional issue, namely: “the need for a support group for women with disabilities in black/African communities; these women are shunned.” Thirty-six participants responded (one did not respond) to this question by choosing from a four-point Likert scale (strongly agree, agree, disagree and strongly disagree). The formula for the weighted index was: $(\text{Number of votes} * \text{Weighting for column 1}) + (\text{Number of votes} * \text{Weighting for column 2}) + (\text{Number of votes} * \text{Weighting for Column 3}) + (\text{Number of votes} * \text{Weighting for column 4}) / \text{Total Number of Votes}$. A higher weighting thus indicates strongly agree and agree. Based on the weighted index issues are ranked from 1 – 10, with 1 being the most important information need.

The well-being of the foetus was ranked as the most important issue on which women needed information, followed by medication in second place, then health facilities if complications arise in the third place, and labour and methods of delivery in the fourth place. The health issues ranking the lowest in terms of need for information were support against abuse, genetic counselling and support to avoid unhealthy lifestyles such as smoking, alcohol intake, substance abuse, etcetera.

Table 2: Perceptions of needs for information on selected issues during current pregnancy

Information needs experienced during current pregnancy (N=36)	Strongly agree	Agree	Disagree	Strongly disagree	Weighted index	Rank
Medication	25	8	3	-	3.61	2
Diet and supplements	19	12	4	-	3.33	5
Diseases and treatment	19	10	6	-	3.27	7
Exercise	18	12	5	-	3.27	7
Labour and methods of delivery	19	11	6	-	3.36	4
Health policies regarding maternity care	13	17	5	-	3.13	10
Well-being of the foetus	29	3	3	-	3.63	1
Stress management	13	15	4	2	2.97	12
Support against abuse	5	11	11	3	2.16	15
Health facilities if complications arise	21	10	4	-	3.38	3
Obstetric danger signs	16	13	4	-	3.08	11
Support to avoid unhealthy lifestyles e.g. smoking, alcohol intake, substance abuse, etc.	10	11	6	6	2.53	13
Prenatal care	19	12	4	-	3.33	5
Rest	15	16	4	-	3.22	9
Genetic counselling	7	12	11	1	2.42	14

Perceptions of needs for information on selected issues immediately after giving birth

Participants had to choose from a four-point Likert scale (strongly agree, agree, disagree and strongly disagree) whether they foresaw information needs on six issues (Table 3) for the period immediately after birth; they could also indicate other issues on which they thought they might need information after delivery. The issues were based on findings from the literature review (Akanbi 2016). Only two participants noted other issues, firstly the need for information on nannies and, secondly, bargains for baby requirements. The options the participants (n=36) could choose from are indicated in Table 3. The same weighting index formula was used as for Table 2; again only 36 participants responded to the question. The issues were ranked from 1 – 6, with 1 indicating the most important issue on which the women thought they might need information.

Table 3: Perceptions of needs for information on selected issues for the period immediately after birth (n=36)

Possibility that information needs might be experienced in the period immediately after the current pregnancy	Strongly agree	Agree	Disagree	Strongly disagree	Weighted index	Rank
Taking care of the baby	19	11	6	-	3.36	3
Family planning	19	12	4	1	3.36	3
Losing weight	20	12	3	-	3.39	2
Baby skin care	20	14	2	-	3.5	1
Employment opportunities	12	9	10	3	2.72	6
Postnatal care	20	10	4	-	3.28	5

According to Table 3, baby skin care ranked highest in terms of information required after the current pregnancy, followed by losing weight in the second place. A tie occurred between taking care of the baby and family planning, hence both are in the third place. Postnatal care is in fifth place while employment opportunities are in the sixth place.

Interest in keeping up to date with new information

Based on the literature, issues were also identified which women might potentially wish to monitor during their current pregnancy or in the period immediately after giving birth. These concerned the need to be informed about new information trends, and development on an ongoing basis (Song et al. 2013). 37 of the participants responded. The issues were developed from the literature review, as well as reports on information monitoring *per se*.

Table 4 reports on the issues on which participants wanted to keep up to date with information and how important they considered staying abreast with new information. The option, 'I need to receive updated new pregnancy-related information', was ranked highest, followed by the option, 'I need to be updated about free access to pregnancy-related information.' 'I need to keep up to date with career development information' was ranked in third place. The least interest in keeping up to date with new information was expressed in the option to keep up with non-pregnancy issues such as daily jokes, horoscopes and weather forecasts, and with supportive information such as information on avoiding abuse and violence. The weighted index was calculated according to the same formula as for Table 2.

Table 4: Interest of the participants in keeping up to date with new information (n=37)

Item	Not interested at all	May consider keeping up to date	Interested	Highly interested	Weighted index	Rank
I need to receive updated new pregnancy-related information	4	12	14	6	2.54	1
I need to be updated about free access to pregnancy-related information	6	10	14	6	2.49	2
I need to keep up to date with supportive information, e.g. information on avoiding abuse and violence	19	9	6	3	1.81	5
I need to keep up to date with career development information	12	8	11	6	2.30	3
I need to take note of daily events and trends	10	12	12	3	2.22	4
I need information on non-pregnancy issues such as daily jokes, horoscopes and weather forecasts	19	10	8	-	1.70	6

Findings and analysis from the interviews

Although the questionnaire addressed information monitoring as shown in Table 4, findings regarding needs for information monitoring were mostly drawn from the interviews as explained in the sub-sections to follow. At the start of each interview the first author again explained the concept of information monitoring to participants in more detail. The interviews were recorded with written consent from participants, translated and subjected to thematic analysis (Saldaña 2013). Findings are discussed according to the sub-headings of perceptions of information monitoring needs: (i) during pregnancy; (ii) as a result of pregnancy; and (iii) perceptions directly after giving birth (i.e. as foreseen by the women). For some women the need for information monitoring is triggered by actions taken by their healthcare service providers, for example gynaecologists, and the information that is shared with them during each prenatal visit.

During pregnancy

Monitoring the health and safety of the baby were identified as the highest priority to the expecting women, especially to those in their forties, the older women. Four of the eleven participants expressed concern about the dangers of high-risk pregnancy. They would primarily like to monitor information on

Down syndrome and the well-being of the baby. Needs for information monitoring in the context of pregnancy do not stand on their own; information needs might be linked to changes and developments in the woman's state (i.e. what is happening with the baby). Needs for monitoring new information that stood out included the following:

- a) Health and safety: The most important pregnancy issue that the participants would like to monitor is the health and safety of their foetus. P1 explained: "The one thing I have sort of monitored in the past eight months was information on the safety and health of the baby because of the age implication." Such information can only be provided by healthcare professionals and thus falls outside the traditional interpretation of information monitoring.
- b) Genetic counselling: Three women carrying high-risk pregnancies expressed interest in monitoring genetic information on Down syndrome and counselling on an on-going basis. P2 said: "Reading about other pregnant women's experiences on Down syndrome has been comforting." This statement also can be related to a need for emotional support, information sharing and reassurance. The focus on Down syndrome is similar to P3's information needs: "We found out of a possibility of our baby having Down syndrome so information on how to deal with Down syndrome if it (the test) came out positive was sought." P3, however did not explicitly continue to link her need for information to ongoing new information on Down syndrome.
- c) Impact of older age: Since they were concerned about their age, P1 and P2 were interested in monitoring information on how age could influence their pregnancy. From the participants, P1 explained: "The safety and health of the baby was sought for because of age implication" (since she cared about her baby's health she wanted to know about information that might become available on the impact of age). P2 expressed a similar concern: "I had looked for information because the age factor was bothering me." (As formulated, this appears more like a once-off information need).
- d) Breastfeeding information: It is widely acknowledged that adequate information on breastfeeding can promote infant well-being. P6 expressed interest in monitoring information on breastfeeding: "I want to know how many times in a day to breastfeed." Although this seems more like a factual, once-off type of information need, the potential need for monitoring information, where the answers might change during the progressive

situation after giving birth, that is, the feeding frequencies change as the baby grows, must be acknowledged.

- e) Emotional support: Participants expressed the need for emotional support. P9 explained: “Sometimes I find myself crying”. This does not seem like a true information need or an issue where information monitoring is expected to play an important role. There is, however, a need between information and coping that has been widely acknowledged (Case and Given 2016), and for this woman information monitoring via social media, blogs and question and answer (Q&A) sites might be useful.

Immediately after pregnancy

Participants also showed concern about a need for information immediately after giving birth where postnatal care concerns both the mother and newborn. The following issues stood out:

- a) Taking care of the baby and skin care: The participants expressed interest in monitoring information on how to care for the baby, especially on skin care. Keeping track of new information and products was considered very helpful.
- b) Medication for the baby: One of the participants expressed a need for monitoring information on infant medication: P9 said: “In case of a situation whereby the baby gets fever.” She needed information on the right and appropriate medicine to administer to her baby when the baby was ill, and she wanted to look for such information not just once-off, but as new information is disseminated.
- c) Surgery wound care, body care and self-care: Women expecting a caesarean section expressed the need to monitor information on wound care. P7 and P3 expressed interest in monitoring information on caesarean section and self-care. P7 explained: “Because am having a caesarean section, I need information on how to avoid allergies from treatment resulting from delivery.” P3 had experienced a previous pregnancy: “... having had a caesarean section, the first would be blood clotting and medication to deal with caesarean section.”
- d) Physical exercise and weight loss: Since pregnancy causes weight gain in women, P7, P3 and P9 confirmed that they would like to monitor information on how to lose weight after pregnancy. P7 said: “I need information on losing weight gain after pregnancy”. Although this seems like a typical once-off information need, monitoring new information that might lead to more effective options might feature.

- e) Family planning: One of the participants (P9) noted that she was interested in monitoring information on family planning: “Family planning for the purpose of birth control”.
- f) Information on allergies: Some participants explained their need to monitor information based on their previous experiences, such as allergies. In the words of P3: “Due to the spinal and epidural during labour I had some serious allergies as a result of the epidural treatments; I wish I knew a little bit more about that.”
- g) Breastfeeding information: P1 explained that after delivery the process of breastfeeding had always been a problem, hence she was interested in monitoring information on breastfeeding. She could not breastfeed her previous babies: “The first and most important will be breastfeeding information because this is one area that I have failed my previous children.” The need to monitor information on breastfeeding was also noted for the pregnancy period as such.

Issues resulting from the pregnancy

Many of the participants confirmed the need to monitor information after giving birth with specific reference to issues resulting from the pregnancy. Two issues stood out from their need to take care of their bodies:

- a) How to maintain healthy blood pressure: P2 noted: “I developed high blood pressure during the second trimester so I will like to be monitoring information on blood pressure.”
- b) Wound care: Pregnant women undergo incisions during delivery. P3 noted the need for information monitoring on wound care: “How to take care of wound incision correctly.” (Wound care is also noted for the period immediately after delivery of the baby).

Discussion

The overall well-being of a mother cannot be over-emphasised during pregnancy for a healthy outcome and emotional well-being. Information can play an important role in addressing both once-off and recurring information needs, and through ongoing monitoring of new information. Pregnant women have been reported as active seekers of information (Song et al. 2013; Das and Sarkar 2014). Some of the women in the current study were aware of not only

information needs that can be categorised as once-off, but also the need to monitor certain information on an ongoing basis. This leaves scope for further work on information monitoring and the use of freely available information services for pregnant women (Akanbi 2016). Information monitoring services available for free have been explored in depth by Fourie (2006).

Needs for information monitoring relate well to issues of importance also reported in the subject literature. This includes the importance of issues related to the overall health and safety of both the mother and foetus that cannot be gainsaid (Das and Sarkar 2014), the effect that age can have on the pregnancy (especially for older women), and the well-being of pregnant women (Das, 2013; Song et al. 2013). The importance of breastfeeding information and preventing infant morbidity or loss has also been stressed (Tuthill, Chan and Butler 2015). Studies on pregnant women have noted that they experience emotional issues such as depression, anxiety and stress (McLean 2013), and therefore provision of emotional support (in terms of stress management information), and monitoring of information appearing on blogs, discussion lists and question and answer websites can be very advantageous for pregnant women, especially in the time directly after giving birth. The need for skincare such as dealing with eczema, heat rashes and other skin infections has also been noted (Chang and Nakrani 2014), and the need for wound and body care after surgery (Farajzadegan, Saeedi and Motamedi 2015). Pregnancy-induced hypertension is one of the conditions pregnant women develop during pregnancy (Pereboom, Mannien, Spelten, Schellevis, and Hutton 2013). It thus makes sense for women to report a need to monitor information on issues such as hypertension. Taking the right medication, and information on managing blood pressure can also be very helpful during the pregnancy. Although high blood pressure is detrimental to the health of the mother and foetus, it can be managed.

The McKenzie model (2003) (Figure 1) noted four modes of information practices engaged in by pregnant women, namely, active seeking, active scanning, non-directed monitoring and by proxy information seeking. Based on findings reported in this article, needs for active information seeking can be confirmed and directed monitoring can be added as several needs for ongoing information monitoring have been noted in this article. Akanbi (2016) also noted passive seeking or accidental encountering.

For pregnant women, the need to monitor information are not always related to the traditional type of information covered by current awareness or alerting services as described by Fourie (2006), and not all the information that pregnant women want to monitor can be covered by databases, journals, books,

discussion lists, and blogs. For some information needs they need ongoing reassurance in the form of information from their healthcare professionals.

Conclusion

Pregnancy is a vital phase in womanhood which has the power to determine posterity. Hence reducing health risks associated with pregnancy with adequate information cannot be over-emphasised. Information monitoring can fill the information gaps not met by healthcare providers through the dissemination of timely alerts, information and notifications. These can be managed on the types of electronic devices preferred by women, and on the pregnancy topics on which they need information both during their pregnancy as well as the period immediately after birth. Although once-off information provision is important, there is also need for ongoing information monitoring. Such information provision can alleviate mortality and morbidity.

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