

**INFORMATION MONITORING AND CURRENT AWARENESS SERVICES
SUPPORTING THE INFORMATION BEHAVIOUR OF PREGNANT WOMEN**

BY

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DECLARATION

I, Olubukola M. Akanbi, declare that this dissertation titled:

Information monitoring and current awareness services supporting the information behaviour of pregnant women

- is my own original work
- has not previously been submitted for degree attainment from any other educational institution.
- Conscious effort has been made to acknowledge and reference all the sources either consulted or used for the purpose of this study.
- The research instruments underwent thorough scrutiny and ethical clearance by the Research Ethics Committees of the Faculty of Engineering, Built Environment and Information Technology and the Faculty of Health Sciences, University of Pretoria.



(Olubukola M. Akanbi)

30th August, 2016

DEDICATION

This work is first and foremost dedicated to God Almighty for His wisdom and grace. I dedicate this work to my better half and husband, Prof Olusegun Ayodele Akanbi, for his love, support and encouragement throughout the study and to my darling son and daughter, Eyimofe and Boluwatife Akanbi.

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
APP	Application (Computer Programme)
ART	Antiretroviral Treatment
ASK	Anomalous State of Knowledge
CAS	Current Awareness Services
CD	Compact Disc
EBIT	Faculty of Engineering, Built Environment and Information Technology
ELIS	Everyday Life Information Seeking
HAART	Highly Active Antiretroviral Treatment
H1N1	Swine Flu Virus
HIV	Human Immunodeficiency Virus
IT	Information Technology
MDG	Millennium Developmental Goals
MMR	Maternal Mortality Rate
MSN	Microsoft Network
PMTCT	Prevention of Mother-to-Child Transmission
RSS	Really Simple Syndication
SDI	Selective Dissemination of Information
SMS	Short Message Service
TOCs	Tables of Contents
UNAIDS	Joint United Nations Programme on HIV/AIDS

UNICEF United Nations Children's Fund

URL Uniform Resource Locator

USA United States of America

WHO World Health Organisation

WWW World Wide Web

ABSTRACT

The future of any society lies with the unborn and young children of that generation: pregnant women are an important part of any society because the outcome of any pregnancy directly affects the hope and future of any society. Provision of reliable pregnancy-related information to pregnant women is especially important if the outcomes of these pregnancies are to be healthy. Africa, particularly Southern African nations, has in the past years recorded a high number of maternal and infant mortality rates, prevalence of HIV/AIDS, diverse forms of abuse, poverty and the increased incidence of communicable and non-communicable diseases. These problems also affect pregnancies.

Information monitoring and current awareness services could assist with the promotion of patient-centered healthcare systems, provision of reliable and new information and a decrease in the maternal and infant mortality rate through the provision of relevant pregnancy-related information to pregnant women. The data for this study was collected over a period of three months (between August and October 2015). The study involved pregnant women visiting two private medical practices of gynaecologists in Pretoria, South Africa.

An explanatory sequential design mixed methods research was adopted for the study (involving both quantitative and qualitative approaches in data collection and analysis). Thirty-seven pregnant women were given copies of the questionnaire to complete and eleven of the thirty-seven were interviewed for the purpose of providing in-depth understanding and explanation of the participants' experiences. The McKenzie two-dimensional model of information practices in everyday life information seeking (ELIS) guided this study.

Findings from the study show that pregnant women have some unique information needs regarding specific uncertainties about their pregnancies, among others on how age can affect their pregnancy because of the possibility of Down syndrome, high-risk pregnancy and the well-being of the fetus. There are also many overlaps in information needs, such as needs for information on breastfeeding, safety and well-being of the fetus, medication, diet and supplements, to mention a few. The study confirmed that pregnant women need

information throughout and after the pregnancy, hence they desire information on an on-going bases.

Problems pregnant women encounter when seeking for information include contradictory and/or unclear advice and information from their information sources, feelings of embarrassment to ask questions on pregnancy, insufficient discussion time with their healthcare providers and lack of access to information sources other than the internet. The study found that current awareness services and information monitoring could benefit pregnant women, because they showed interest in receiving new pregnancy-related information on safety during pregnancy, new trends regarding pregnancy, experiences and advices from other mothers. They also desired to be updated about free access to pregnancy-related information in order to meet their pregnancy-related information needs on among others medication, diet and supplements, disease and treatment, labour and method of delivery.

This study adapted the McKenzie two-dimensional model of information practices in ELIS adding two other modes of information seeking (namely directed monitoring, passive and accidental encountering). In addition, two new models were developed in the course of the study to deal with key activities of information behaviour that stood out from the findings of this study and pregnant women's pre and postnatal information needs and potential of information monitoring.

This study recommends that information monitoring and current awareness services should promote monitoring of new information and generate more reliable health information for pregnant women at little or no cost for the purpose of staying abreast with new information, which could assist in reducing their uncertainties about pregnancy. More consideration should be given to mobile devices as a channel of communication with pregnant women and for information monitoring.

This study also recommends more investigation into both expressed and unexpressed information needs of pregnant women in a social context, taking positioning theory into consideration. Social context could further reveal the ELIS of pregnant women. Social context tends to shed light on the area of needs of pregnant women especially through their discussions with other people (chatting). In addition, their discursive interactions

with other people especially their healthcare providers and family members can reveal the relevant health topics or pregnancy-information needed.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Information monitoring is important, especially in terms of keeping track of recent changes in trends and staying abreast of new information (Hughes & Glueckert, 2014¹; Strayer *et al.*, 2010; Liu, 2004; Liu *et al.*, 2002). Information monitoring has been used extensively by professionals in contexts such as scientists, lawyers and scholars, and more recently also in everyday life (Yeoman, 2010; Case, 2006; McKenzie, 2003a).

The internet has introduced numerous opportunities to offer current awareness services (CAS, also known as alerting services) and thus information monitoring at no cost or at very reasonable fees. It has also offered opportunities to diverse groups of people to benefit from CAS available through the internet. More people can monitor information in their own time and according to their specific needs. The internet has made information access ubiquitous and often free; people from all walks of life can easily gain access to information, provided they know how to use the internet (Barr, 2006; Fourie, 2003). Fourie (1999: 380) confirms that since there is free access to more information via the internet, it is no longer only the wealthy who can afford information, but any individual who has the ability to use the internet.

CAS enhances the availability of access to current information and people may keep themselves reasonably aware of developments by selecting an appropriate range of authoritative sources and scanning or monitoring these on a regular basis (Rowley, 1998: 277-278). The use of CAS and the need for it have been explored by studies of information behaviour (Witman & Stern, 2014; Fourie & Bakker, 2009; Fourie & Claasen-Veldsman, 2007).

The trend in information behaviour studies has moved from studies of information behaviour in academic contexts and the information behaviour of professionals, such as academics and scientists, to non-work-related situations (Fisher & Julien, 2009; Case, 2006). This is also evident from Case (2006) reporting on the information behaviour of specific groups, such as academics, scientists, students, occupational groups and ordinary people in everyday life

¹ References are organized according to date of publication; most recent references first.

situations, including health contexts. Das and Sarkar (2014), Case (2006) and McKenzie (2003a) have also noted information behaviour in a non-employment role such as with patients. Pregnant women fall in this category. McKenzie (2002a, 2002b, 2003a, 2003b) and McKenzie (as reported in Carey, McKechnie & McKenzie, 2001) studied the information behaviour of pregnant women, in some cases along with the information behaviour of their midwives (McKenzie, 2004). Browner and Press (1997: 117) found that “getting and giving information is the fundamental function of American prenatal care and pregnant women consider being informed to be foremost among the responsibilities conferred by pregnancy.”

Against this background, it seems timely to consider the information behaviour of pregnant women with special reference to information monitoring and the use of CAS available for free via the internet.

1.2 BACKGROUND TO THE STUDY

As a result of the advent of the internet, the world is experiencing an overload of information specifically for users of the internet (Kern & Mu, 2011; Strayer *et al.*, 2010). Information overload refers to the growth in the amount of information published annually (Rowley & Turner, 1978: 23). Substantial amounts of information on any topic can be accessed and downloaded in a short period. Apart from retrospective searches on databases and other information resources, CAS can be used (Hamilton, 1995; Kemp, 1979). According to Fourie (2006: 33), ‘alerting services’ (the term she uses as alternative to CAS) refers to a system that offers a particular group of people information on current developments and updated information that is relevant to their career and workplace, as well as information on societal needs. CAS have been used for many years, especially in library and information services (Glusker, 2013; Mahesh & Gupta, 2008).

CAS can be offered in either electronic or print formats according to the interest of users to make them aware of the latest information available from diverse service providers. The emphasis is on the convenience of services once set up (Barr, 2006: 15; Rowley, 1998: 277).

The importance of relevant and reliable information for pregnant women cannot be over-emphasised. It is evident in the regular visits of pregnant women to hospitals and clinics for prenatal visits (Grimes, Forster & Newton, 2014; McKenzie, 2004). During such visits, healthcare providers such as nurses and midwives provide pregnant women with advice and

information on diets and the necessary supplements, medication, methods of delivery, exercise and other related topics (Hameen-Anttila *et al.*, 2015; Arrish, Yeatman & Williamson, 2014; Openshaw, Bomela & Pretlove, 2011). They may however, need more information on how to make informed decisions related to fetal and maternal health development (Asplin *et al.*, 2014; Song *et al.*, 2013; McKenzie, 2004: 685-686).

Larsson (2009: 15) notes that pregnant women and their spouses obtain psychosocial and emotional support from the information provided at healthcare facilities and obtain “advice and reassurance on problem-solving and empowerment to improve self-care and prepare the couples for childbirth and parenthood.” According to Rozmovits and Ziebland (2004: 57), information found on university web pages or web pages of health ministries are more reliable as sources of health information than information found elsewhere. In addition to this, CAS can deliver updated information to pregnant women relevant to their information needs during their pregnancy. Information needs often change in varying health situations, for example in the case of a cancer patient where information needs during treatment differ from information needs at the time of diagnosis (Fourie, 2012; Johnson & Case, 2012). This might also be true for pregnant women.

1.3 CLARIFICATION OF CONCEPTS

It is important to explain the following concepts to gain better understanding of the key terms that will be used in this study: CAS, alerting services, information monitoring, information behaviour (including information needs, information seeking) and pregnant women. The concepts are thus explained before other key components such as the problem statement, purpose, objectives and value of the study for the study.

1.3.1 Alerting services

The concept alerting services is often used interchangeably with CAS. However, it also has its own definitions. Alerting services are services concerned with informing users of recent publications of literature items in their specific fields or subjects (Brannon *et al.*, 1969: 1). According to Bottle (1970: 1), alerting services refer to the timely retrieval of current information for people and can be described as an “early warning for useful information.”

For the purposes of this study “current awareness services” is preferred, as defined in Section 1.3.2.

1.3.2 Current awareness services

The terms CAS, alerting services and selective dissemination of information (SDI) services are often used interchangeably, although there are slight differences between them; thus, for the purpose of this study, SDI will not be defined. A current awareness service is a specialised service offered to users of an organisation or information centre to keep them abreast of recent developments in their subject field or area of interest. It can also be regarded as a system for providing users with information on current events and developments, as well as providing them with updated information in their field of interest. Different scholars (Rowley, 1998; Hamilton, 1995; Kemp, 1979) have defined the concept of CAS. Fourie (2003: 184), for instance, defines a current awareness service as “a selection of one or more systems that provide notification of the existence of new entities added to the system’s database or of which the system took note (e.g. documents, web sites, events such as conferences, discussion groups, editions of newsletters). Current awareness services automatically notify users or allow users to check periodically for updates. The entities can be specified according to users’ subject interests or according to the type of entity (e.g. books or newsletters).”

A current awareness service has also been defined as a service that provides the recipient with information on the latest developments in the subject areas in which he or she has a specific interest or need to know (Hamilton, 1995: 3). Hamilton (1995: 3) states that a current awareness service is a specialised service offered by information professionals. It entails developing a profile for the subject interests of people and updating the particular group of people with information in relation to their information needs. CAS have also been defined as “systems for reviewing newly available documents, selecting items relevant to the needs of an individual or group, and recording them so that notifications may be sent to those individuals or groups to whose needs they are related” (Kemp, 1979: 12).

For the purpose of this study, the term CAS refers to services that provide their users with current information on specific subjects or topics of interest in order to update their knowledge and stay abreast with the most recent issues, trends, publications, advice, and services via the

internet, electronic or print formats on their preferred information communication devices such as mobile phones, short message service (SMS), smartphones and computers.

1.3.3 Information behaviour

“Information behaviour means those activities a person may engage in when identifying his or her own needs for information, searching for such information in any way and using or transferring that information” (Wilson, 1999: 249).

According to Steinevora and Susol (2005: 1), information behaviour can be described as human actions in a dynamic information environment. Steinevora and Susol (2005) further argue that information behaviour entails information processing by people, as well as communication and interaction with different sources of information and know-how.

Information behaviour includes all aspects of searching, seeking, and use (Wilson, 2000: 49-50). Case (2006: 293) confirms that information behaviour entails “purposive information seeking; serendipitous encountering of information; and the giving, sharing and use of information.” Information behaviour concerns interaction with a collection of potential sources that might address one’s interests and information needs. Wilson (2000: 49-55) also defines information behaviour as “the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use.”

According to Savolainen (2007: 109), information behaviour and information practice are two concepts used in expressing diverse manners in which people relate with information. The concept “information practice” is associated with the work of McKenzie (2003a: 19), who asserts that information behaviour is a “range of practices that can be premeditated as actively browsing for information to meet a known need or as serendipitous as encountering an unexpected source, miscellaneous fact, or familiar situation that may be of some assistance in meeting some present or future need” (McKenzie, 2003a: 19). This relates well to arguments that information behaviour includes both active and passive interaction with information sources; it could also be referred to as indirect or unintended encountering of useful information (Erdelez, 1999: 26).

According to Fisher and Julien (2009: 1), information behaviour “focuses on people’s information needs; on how they seek, manage, give, and use information, both purposefully and passively, in the varied roles that comprise their everyday lives.”

For the purposes of this study, the term information behaviour is accepted as human behaviour seen or perceived during active or passive interaction with any form of information capable of breaching the gap in the knowledge state of its recipient.

1.3.4 Information monitoring

Information monitoring refers to the process of monitoring and keeping track of new information on websites and webpages based on the topics of interest specified by its users (Liu, 2004: 631; Tan, Foo & Hui, 2001).

It also refers to people becoming aware of changes that may occur in the content of information they require from information sources, e.g. internet web pages and sites (Tan, Foo & Hui, 2001: 6-8). According to Liu *et al.* (2002: 264), information monitoring applies to systems designed to “notify users of interesting changes with personalized messages in web pages and also provide information automatically while it is still fresh.”

Information monitoring is an activity that deals with automatic location, finding, personalised notification and delivery of new information from various websites to users (Liu *et al.*, 2002). Information monitoring refers to the use of push technology for transferring and communicating information provided on the internet, as well as the use of artificial intelligence for collecting and disseminating new information in a timely manner (Kassel, 2000). Liu (2004) describes information monitoring as an activity related to the periodic updating of users with personalised notifications on specific web information requested to be monitored. It is a dynamic activity of keeping track of information (Fong, 2012).

For the purpose of this study, information monitoring is the activity of ensuring notification of and keeping track of new information from different information resources, such as websites and webpages, databases, journals, magazines, blogs, newsletters and discussion lists. Information monitoring can be conducted through subscription to such resources or by means of regular monitoring. The intention is timely notification and staying abreast of information.

1.3.5 Information needs

Information need refers to an inward state of making sense of a particular situation, as well as the “desire to find information to bridge the gap in the knowledge state of a person in order to satisfy a goal” (Dervin, 1999: 730). Atkin (1973: 206) defined information need “as a function of

extrinsic uncertainty produced by a perceived discrepancy between the individual's current level of certainty about important environmental objects and a criterion state that he seeks to achieve." An information need could also be an "anomalous state of knowledge" (ASK). ASK occurs when a person identifies a gap in the knowledge state in a given circumstance (Belkin, Oddy & Brooks, 1982: 62-63).

An information need is a state that triggers information seeking in a person. According to Wilson (2000: 49-55) "it may also involve other people through information exchange and information perceived as useful may be passed to other people." In order to meet the need, information can be sought from formal or informal information sources or services, which result in success or failure in finding relevant information.

For the purpose of this study the term 'information needs' refers to the conscious or subconscious state of mind of a person that triggers the need to get information to achieve a goal or overcome some uncertainty in the person's knowledge state.

1.3.6 Information seeking

Information seeking is the conscious search for information to satisfy a need to fulfil some goals (Wilson, 2000: 49). Information seeking occurs as a result of an information need experienced by an information user. It refers to "any activity of an individual that is undertaken to identify a message that satisfies a perceived need" (Krikelas, 1983: 6).

Information seeking is a "process in which human beings purposefully engage in order to change their state of knowledge closely related to learning and problem solving" (Marchionini, 1995: 5). Johnson (1997: 26) defines information seeking as "purposive acquisition of information from selected information carriers". Information seeking is the active effort taken in response to an information need.

Information seeking refers to "all the information that comes to a human being during a life time, not just in those moments when a person actively seeks information" (Bates, 2002: 3).

For the purpose of this study information seeking is accepted as information activities an individual engages in as a result of ascertaining a gap in the state of knowledge and steps taken to reduce or eliminate the knowledge gap in order to achieve a purpose.

1.3.7 Pregnant women

The term pregnant woman refers to a woman carrying a developing offspring within the body (Melloni's *Illustrated Medical Dictionary*, 1985: 389). Pregnant women are also referred to as expectant or expecting mothers. In addition, Stedman's *Medical Dictionary* (1966) defines a pregnant woman as a female big with a child, bearing within her the product of conception. For the purposes of this study pregnant woman refers to a female human being implanted with a fetus in the womb.

1.4 BRIEF LITERATURE REVIEW

The field of information behaviour has experienced a gradual change in focus from the study of the direct relationship that exists between a prospective user with information channels and systems to a more user-centered focus, studying how users individually seek, share and use information channels and systems (Courtright, 2007: 273; Pettigrew, Fidel & Bruce, 2001). The user-centered focus provides more insight on particular contexts in which information seeking, needs, use and sharing occur as a process (Vakkari, Savolainen & Dervin, 1997). Hence, information behaviour as a concept cannot be studied in a vacuum; it has to be studied from a particular setting or context. Courtright (2007: 276) define context as "frame of reference for information behaviour." For this study, the context will be pregnancy.

McKenzie (2004: 686) points out that pregnant women can offer a rich context in which to study information behaviour. Information services for pregnant women and parents can be self-generated or recommended by someone else (Gross, 1999: 501). Das (2013), Song *et al.* (2013) and McKenzie (2002, 2003) report that only a few published studies on pregnancy and information behaviour exist. McKenzie (2002) and Pettigrew (1997) describe the various kinds of information behaviour that occur when pregnant women spend time in medical clinics for the prenatal check-up. Browner and Press (1996: 117) suggest that receiving and providing information is an important role of American prenatal care and information seeking by pregnant women is a normal phenomenon during pregnancy.

Pregnant mothers are in search of relevant pregnancy-related information, advice, reassurance, new developments and trends in the field of medicine regarding pre and postnatal care, diets and supplements, relevant exercises, vaccinations, medication and health-related pregnancy issues (Hameen-Anttila *et al.*, 2015; Aborigo *et al.*, 2014; Pereboom *et al.*, 2013; Sheih, 2010: 2).

McArdle *et al.* (2015), and McDonald *et al.* (2014) discuss how to assist women during all phases from pre-conception through post-delivery. According to Sheih (2010: 2-4), pregnant women's behaviour differs in the sense that first-time pregnant women's attitude to prenatal care is dynamic, while multiparous women (women who have had more than one child) are more dependent on previous experiences for prenatal care information.

McKenzie (2003a: 19-27) developed an everyday life information seeking (ELIS) information practices model, taking an individual's ELIS into consideration. The model was developed based on the constructionist approach in discourse analysis. The constructionist approach in discourse analysis provides insight into how accounts are constructed or created and made realistic. The McKenzie model was developed based on four basic information practices, namely active information seeking, active information scanning, non-directed monitoring and by proxy. The model also focussed on less-directed information seeking (accounts of individuals when passively seeking information in their daily lives). The target group for her study was nineteen Canadian women pregnant with twins.

Quite a large number of information behaviour research models focus on active information seeking rather than passive information seeking (Savolainen, 2007; McKenzie, 2004). McKenzie (2003a) notes that the information behaviour (or information practices) expressed in everyday life reflect less directed information practices, i.e. passive information seeking. Models focusing mainly on active information seeking cannot offer complete and rich insights on passive information seeking or information encountering, which is often the case with efforts to keep up with new information; hence such models do not fully explain information behaviour and information practices (McKenzie, 2003a: 19-37; Erdelez, 1999; Savolainen, 1995). Yeoman (2010) argues that the McKenzie model allows for passive as well as active information seeking. For the purpose of this study, the McKenzie (2003) model will be used as conceptual framework.

Although much has been published on CAS for various groups, no literature is available on the combination of information monitoring and CAS for pregnant women.

1.5 STATEMENT OF THE PROBLEM AND RESEARCH QUESTIONS

Since the internet and CAS available through the internet can be a valuable source of new information for pregnant women, it is necessary to understand their information behaviour and

needs for CAS, as well as sources of CAS that might be of specific interest to pregnant women requiring information on an on-going basis.

The problem for this study thus concerned the information behaviour of pregnant women and the way in which CAS can help to meet their information needs:

What are the information needs and information behaviour of pregnant women, with specific reference to needs to monitor new information and the use of current awareness services?

To address the problem, the following research sub-questions had to be answered:

- What has been reported in the subject literature on the information behaviour of pregnant women and related groups?
- What has been reported in the subject literature on the use of information monitoring and CAS with regard to healthcare and everyday life contexts?
- What are the information needs of pregnant women?
- What is the purpose of information seeking by pregnant women?
- What is the importance of information monitoring to pregnant women?
- What problems do pregnant women face in seeking information to keep up with the latest information?
- How can pregnant women use CAS?

1.6 PURPOSE, OBJECTIVES AND VALUE OF THE STUDY

The purpose of the study was to determine the information behaviour and information needs of pregnant women regarding information monitoring and the use of CAS. The main objectives were to:

- Determine their information needs and purposes for information seeking
- Determine the importance of information monitoring
- Determine problems faced during information seeking
- Determine how CAS can be used

Based on this, women can be directed to appropriate websites and web services and they can be educated on the value of information monitoring and CAS for them. The findings can also be informative for healthcare professionals and healthcare service providers in providing

information to pregnant women and in recommending websites and other information resources to consult.

1.7 RESEARCH METHODOLOGY

It is important to identify the methods that will be adopted for a research project in order to provide thorough insight into how the study (addressing the research problem) will be carried out. The thoroughness of the methodology will indicate to what extent the research findings will be valid and useful.

1.7.1 Research design

Research is a systematic process of inquiry proceeding from initial ideas to final communication (Graziano & Raulin, 2000: 317). There are two main research approaches, namely quantitative and qualitative research designs, and sometimes mixed methods research approaches (Creswell, 2014; Leedy & Ormrod, 2013; Pickard, 2007). For the purpose of this research project both qualitative and quantitative approaches are noted in the literature on information behaviour (Das, 2013; Das & Sarkar, 2014). However, a mixed methods approach supporting triangulation of data and findings often seems to be preferred (Creswell, 2014: 201). Sometimes the term multi-method research is used (Case & Given, 2016: 207).

1.7.2 Methods of data collection

The data collection methods adopted for a research study depend on the research design as qualitative, quantitative or mixed methods. Decisions depend on the types of data the researcher intends collecting and analysing (Creswell, 2014: 155; Neuman, 2011: 46). According to Neuman (2011: 46), quantitative methods are intended to gather data in the form of numbers and statistics, while qualitative methods are intended to gather data in the form of words in order to gain insights into participants' views, feelings, perceptions and experiences (Creswell, 2014; Pickard, 2013).

There are different methods of research, namely surveys, case studies, observation, experimental studies, action research and historical research (Pickard, 2007; Graziano & Raulin, 2000: 129-131). There are also different methods of data collection. Methods of data collection include questionnaires conducted by mail, web, telephone and face-to-face. Other methods of data collection are interviews, which could be structured, unstructured or semi-structured interviews

offered individually or in group (focus group) interviews. In addition, internet opinion polls, observations, document analysis (public or private), audio-visual materials (such as videotapes, art objects, pictures and films) can be analysed (Creswell, 2014: 191; Gorman & Clayton, 2005: 125-126; Graziano & Raulin, 2000: 140-141).

Face-to-face interviews and a self-administered print-based questionnaire were used for this study.

1.7.3 Sampling

Sampling is a technique whereby a smaller section of the population is chosen to represent the larger population's characteristics; a sample is a subset of individuals representing the population (Gorman & Clayton, 2005: 128; Graziano & Raulin, 2000: 112-113). Sampling is the process of selecting a portion of the entire population to engage in the research process (Pickard, 2007: 59). The sample for this study comprised pregnant women visiting two private medical practices of gynaecologists in Pretoria, South Africa. Convenience and purposeful sampling techniques were considered appropriate for this study.

Convenience sampling is based on the availability and accessibility of the sample, e.g. of pregnant women, and convenience for the researcher (Pickard, 2007:65). The sample number for this study was thirty-seven pregnant women and eleven (out of the thirty-seven) for the interview. The participants were from two sites of private medical practices of gynaecologists. McKenzie (2003a) used nineteen participants for her study. For in-depth qualitative studies, small numbers of participants are acceptable (Given, 2015) and thus the participation of thirty-seven women was considered sufficient for this study.

1.7.4 Ethical clearance

Ethical clearance to carry out data collection was obtained from the Faculty Committee for Research Ethics and Integrity of the Faculty of Engineering, Built Environment and Information Technology (EBIT) and the research ethics committee of the Faculty of Health Sciences, University of Pretoria. Research approval was also requested from the Department of Information Science of the University of Pretoria before data was gathered from the sample population. In addition, permission was solicited from two gynaecologists to conduct the study with pregnant women visiting their private medical practices in Pretoria.

1.8 DEMARCATION OF THE STUDY

The demarcation of this study is derived from the content, geographical and participant focus.

- Content focus: information behaviour of pregnant women with specific reference to their needs for information monitoring and CAS.
- Geographic focus: the geographic focus for this study was Pretoria, South Africa.
- Participant focus: pregnant women.

1.9 DIVISION OF CHAPTERS

The dissertation consists of seven chapters, namely:

Chapter one outlines the background to the study and provides some clarification of concepts and brief literature review. It also highlights the problem statement and research questions and indicates the purpose, objectives and value of the study. Lastly, research methodology and demarcation of the study are highlighted.

In **Chapter two** a literature review on healthcare in context, pregnancy and healthcare, pregnancy and healthcare in South Africa, health information behaviour of pregnant women, information behaviour of pregnant women, importance of information for pregnant women, information needs of pregnant women, problems experienced by pregnant women, preferences for information channels and information seeking and factors affecting information seeking, provision of information for pregnant women and model of information seeking behaviour that can be applied to pregnancy are presented.

Chapter three provides a review on the background on CAS, types of CAS, information seeking behavior models that refer to information monitoring, value of CAS and information monitoring and profiling of CAS for pregnant women.

Chapter four highlights the problem statement, research question and sub-questions and research design, including the research approach, research method, study sample, data collection methods and method of data analysis. It also explains the validity, reliability and adherence to ethical issues of the study.

Chapter five deals with the findings and analysis of the data collected.

Chapter six begins with a brief triangulation of findings from the literature review (Chapter 2 and 3) and empirical findings (Chapter 5). It comments on the suitability of the McKenzie (2003)

model for meeting the needs of pregnant women and proposal of additional models that can portray findings from the study.

Chapter seven summarises reflection on meeting the purpose and objectives of the study. It focuses on the summary of conducting the empirical study, summary of findings for research sub-problems, limitations of the study, value of the study from both practical and theoretical point of view, recommendations for theory and practice and provides recommendations for further research.

CHAPTER 2

LITERATURE ANALYSIS - HEALTH INFORMATION BEHAVIOUR

2.1 INTRODUCTION

The purpose of this chapter is to offer a brief review of the literature on pregnancy and information seeking behaviour as background for a study on how CAS and information monitoring can support the information behaviour of pregnant women. This is done against brief reviews of the literature on pregnancy and healthcare in South Africa. The use and potential of CAS in healthcare and for pregnant women will be covered in Chapter 3. This literature analysis seeks to gain better insight on their information needs, information seeking, preferences for information sources and their need for information monitoring and how CAS can support their information needs.

This chapter is divided into four sections and eight sub-sections. Section one explains healthcare in context, section two describes health information behaviour in general with regard to women, section three outlines information behaviour of pregnant women and section four describes the model of information seeking behaviour that can be applied to pregnancy. The sub-sections include pregnancy and healthcare, pregnancy and healthcare in South Africa, the importance of information, information needs, problems experienced, preferences, information seeking and provision of information for pregnant women.

2.2 HEALTHCARE IN CONTEXT

Case (2012: 301) notes that healthcare is a vital issue at present in view of the rise in the occurrence of health problems such as chronic diseases, obesity and substance abuse, communicable and non-communicable diseases. These illnesses are causing greater dependence on healthcare for extending the life span of individuals. The importance of effective healthcare systems cannot be over-emphasised, especially because of the immense burden created by poor health facilities, inadequate healthcare providers and poverty or poor economic factors (Moosa & Gibbs, 2014; Snyders & Van Dyk, 2014; Abegunde *et al.*, 2007; Myer & Harrison, 2003).

According to Carrera (2015) and Case (2012), research in the medical field is constantly developing sophisticated drugs and practices to sustain a healthy society and hence there is the challenge of sophisticated healthcare being very expensive (Akena *et al.*, 2015; Carrera, 2015; Olliaro *et al.*, 2015; Adams *et al.*, 2014) and not available to all. Lau *et al.* (2014) and Moosa and Gibbs (2014) confirm this to be true of South Africa, also with regard to pregnancy in South Africa (Sliwa *et al.*, 2014; Tomlinson *et al.*, 2014) and elsewhere in the world (Burton, 2013; UNAIDS, 2013).

According to Boerma (2013), Case (2012: 301-302), Johnson and Case (2012: 4) and the World Health Organisation (WHO, 2011), healthcare information systems cover a vast spectrum of health information on diverse health topics and issues. Health information systems are fundamental tools of healthcare systems for achieving the health-related millennium developmental goals (MDGs) and are essential for monitoring health systems (Boerma, 2013; Mutale *et al.*, 2013). In addition, the advent of health information technology has promoted reliance on self-help to secure and retrieve information (Ayatollahi, Bath & Goodacre, 2013; Clarke *et al.*, 2013: 178-180).

Poor provision of information to pregnant women causes preventable health risks and complications (McArdle *et al.*, 2015; Pereboom *et al.*, 2013). Studies on pregnant women have shown that a great number of pregnant women do not understand the benefits of prenatal care simply because of lack of adequate information on its benefits (Lau *et al.*, 2014; Openshaw, Bomela & Pretlove, 2011; Myer & Harrison, 2003).

Healthcare information systems are useful for better health service delivery because of their ability to generate, assemble, organise, report, retrieve and use timely health-related data and information in order to solve some pressing health-related challenges due to a great number of shortcomings experienced from healthcare providers (Boerma, 2013; Clarke *et al.*, 2013; Mushi & Maharaj, 2013). In healthcare, there are various reasons for the need to stay abreast with the most recent health information becoming available (Bridgen, 2014; Badgett & Fernandez, 2013). Greater cognisance is taken of the measure of how health information is used, especially by pregnant women (Cormick *et al.*, 2012; McKenzie, 2004). For example, Das and Sarkar (2014), Das (2013) and Song *et al.* (2013) discuss how pregnancy elicits the need to acquire more

information on especially nutrition, breastfeeding, medication, physical exercise and fetal development. Pregnancy and healthcare are explained in more detail in the next section.

2.2.1 Pregnancy and healthcare

UNICEF (2009) reveals that millions of pregnant women around the world suffer from health problems affecting pregnancy, such as food and water-borne diseases, obesity, sclerosis and substance abuse. The root cause of complications arising from such problems is delay in accessing healthcare services. Thaddeus and Maine (1994: 1091-1110) suggest three forms of delay in accessing healthcare services, namely lack of ability to identify a need for healthcare, distance from a healthcare facility and lack of ability to receive the necessary care at the healthcare facilities. Schoon (2013), Adesiji, Dada and Komolafe (2012), Lori and Starke (2012) and Pacagnella *et al.* (2012) confirm that pregnant women often encounter delays in accessing healthcare services and facilities.

Maternal mortality is a serious challenge associated with pregnant women in different countries (Aborigo *et al.*, 2014; Lau *et al.*, 2014). According to the WHO (2014) maternal death can be defined as “the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.” In 2012 the Department of Health stated in The Saving Mothers (2012) report that the maternal mortality rate (MMR) had increased even more than in previous years. The Saving Mothers report for 2008-2010 recorded 4 867 maternal deaths between 2008 and April 2011 in its findings and since then the MMR has skyrocketed at all levels in comparison with records of 2005-2007.

Hogan *et al.* (2010) report on a study on maternal mortality carried out in one hundred and eighty-one countries between 1980 and 2008. The study shows that on a national scale an estimated 342 900 deaths were recorded among pregnant women in 2008 compared to 526 300 deaths recorded in 1980. Conversely, the report shows that progress has been delayed especially in many developing countries by inadequate and unaffordable healthcare facilities, leading to high MMRs. The incidence of maternal mortality is difficult to measure, as it varies from one country to another (Hogan *et al.*, 2010). Russell, Eaton and Petersen-Williams (2013) found that the death rates for pregnant women were higher in developing countries than in developed countries. Combating maternal mortality has also stimulated great awareness and monitoring in

the United States of America (USA), as is evident from President Obama's policy declaration on alleviation of the challenge of maternal deaths during his administration in the USA (Heisler, 2012; King, 2012; Hogan *et al.*, 2010).

Perinatal loss (also known as stillbirth, infant death, ectopic pregnancy and miscarriage) is a common phenomenon that occurs in 20% to 25% of all pregnancies (Cote-Arsenault *et al.*, 2014; Hutti, Armstrong & Myer, 2011; Cote-Arsenault, 2007). Pregnant women who have experienced perinatal loss are more dependent on healthcare facilities for successful delivery compared with those who have not experienced prior loss of pregnancy (Hutti, Armstrong & Myer, 2011). Pregnancy is an important phase in womanhood; the period seems to be different and unique in every woman (Das, 2013; Huberty *et al.*, 2013). Wabiri *et al.* (2013) confirm that the most important factors that can improve the well-being of pregnant women and the developing fetus and decrease maternal mortality are equal and stress-free access to healthcare services, creation of awareness on prenatal care, especially for women in rural areas, provision of a fast and safe mode of transportation to healthcare facilities and provision of skilled healthcare providers (Schoon, 2013; Pacagnella *et al.*, 2012).

Prenatal care (i.e. care provided to prepare pregnant women for delivery) is important in pregnancy in order to reduce perinatal loss and maternal mortality. Usually prenatal care is delivered at healthcare centers by healthcare providers (Wabiri *et al.*, 2013; Lori & Starke, 2012). Health issues such as obstetric advice, nutrition and medication are usually discussed (Berhan & Berhan, 2014; Legault & Marquis, 2014). Dida *et al.* (2014) report that under-utilisation of healthcare facilities by pregnant women in developing countries tends to increase the chances of adverse health consequences for the mother and child; for example, most poor women living in rural areas settle for the cheapest option of giving birth at home. Wabiri *et al.* (2013) confirm that pregnant women with low socioeconomic power are likely to experience few healthcare visits, which makes them vulnerable to health risks because they cannot afford good healthcare facilities. The National Institute for Health and Clinical Excellence recommends seven to ten prenatal visits during pregnancy, while the South Africa Department of Health recommends a minimum of one visit in every trimester (i.e. a minimum of four visits) (Berhan & Berhan, 2014; Solarin & Black, 2013: 359-367; Openshaw, Bomela & Pretlove, 2011: 1).

Maternal healthcare has been recognised as an important entity by many top foreign agencies (McDonald *et al.*, 2014; Wang *et al.*, 2011). Improving maternal and infant health is one of the objectives of the MDG (MDG-5), as well as a vision of the government of the Republic of South Africa (Dida *et al.*, 2014; Solarin & Black, 2013; Harrison, 2009). The MDG (MDG-5) is a global initiative set up by the United Nations member states during the Millennium Summit of the United Nations in 2000 for the developmental growth and expansion of developing nations (Lomazzi, Borisch & Laaser, 2014).

The next section deals with pregnancy and healthcare in relation to South Africa.

2.2.2 Pregnancy and healthcare in South Africa

The overall outcome of pregnancy determines the future of any society (Lau *et al.*, 2014; Silal *et al.*, 2012). However, the rate of maternal mortality and perinatal loss in Africa, including South Africa, has been on the increase (Myer *et al.*, 2015; Jaldesa, 2014; Tsai *et al.*, 2014). This section covers the quality of healthcare, mortality rates, HIV/AIDS and treatment, comorbidities with other diseases and conditions, social issues and awareness and need for care for pregnant women in South Africa.

2.2.2.1 Quality of healthcare for pregnant women in South Africa

Healthcare centers have the central responsibility of providing both pre and postnatal care for pregnant women (Lau *et al.*, 2014; Tsai *et al.*, 2014; Openshaw, Bomela & Pretlove, 2011). After the inception of constitutional democracy in South Africa in 1994, the public healthcare sector has catered for the health requirements of pregnant women in the country (Buisman & Garcia-Gomez, 2015; Lau *et al.*, 2014; Myer & Harrison, 2003). Regardless of free healthcare in terms of pre and postnatal care, an increase has been recorded in the occurrence of late prenatal visits in various healthcare centers in South Africa (Lau *et al.*, 2014; Clouse *et al.*, 2013; Abraham, Jewkes & Mvo, 2001). Environmental factors, spatial distribution of healthcare facilities (Wet & Ngubane, 2014; McCray, 2004) and poor awareness of the benefits of prenatal care among pregnant women have been noted as the reasons they under-utilise prenatal care facilities (Mall *et al.*, 2014; Silal *et al.*, 2012).

Poor quality of healthcare has been recognised in recent studies as one of the key causes of increased maternal deaths in South Africa (Haskins *et al.*, 2014; Mall *et al.*, 2014; Mayosi *et al.*,

2012). Renfrew *et al.* (2014) are of the opinion that to ascertain the degree of care provided to women during pregnancy, certain factors (such as the quality of care, the way it is being delivered and where it is provided) have to be linked with healthcare providers (Moosa & Gibbs, 2014; Silal *et al.*, 2012). Skilled midwives and doctors are fundamental elements in healthcare delivery to pregnant women (Asplin *et al.*, 2014; Lucas, Charlton & Yeatman, 2014). A shortage of skilled healthcare providers in South Africa has, however, been noted in the literature (Marten *et al.*, 2014; Mayosi & Benatar, 2014; Moosa & Gibbs, 2014). Inadequacy in healthcare human resources is causing increased burn-out, absenteeism, low productivity and inadequate provision of care, particularly to pregnant women (Schnippel *et al.*, 2015; Haskins *et al.*, 2014; Moosa & Gibbs, 2014).

A few studies have stressed the importance of well-trained healthcare providers in delivering quality care to patients (Haskins *et al.*, 2014; Lau *et al.*, 2014). Renfrew *et al.* (2014) and Silal *et al.* (2012) confirm that educated and qualified nurses have a strong connection with good quality healthcare delivery to patients, whereas Blignaut, Coetzee and Klopper (2014) argue that nurses' qualifications have no correlation with good quality care delivery or the safety of patients.

Unethical behaviour and attitudes have been identified among South African healthcare providers (Haskins *et al.*, 2014; Silal *et al.*, 2012). Silal *et al.* (2012) report that hostile patient-provider relationships exist in healthcare centers, especially concerning pregnant women. Haskins *et al.* (2014) discuss the attitudes of healthcare providers in carrying out their responsibility to patients. Haskins *et al.* (2014) found that healthcare providers were dissatisfied with some issues associated with the profession, such as absenteeism, an insufficient work force to handle the large number of patients and lack of proper communication, most especially with their patients.

Insufficient healthcare services are another setback facing pregnant women in South Africa (Mayosi & Benatar, 2014; Ngidi *et al.*, 2013; Wabiri *et al.*, 2013). The unequal distribution of healthcare centers in different provinces in South Africa compels pregnant women living in remote areas to travel long distances before getting access to adequate healthcare (Wesolowski *et al.*, 2015; Wabiri *et al.*, 2013; Silal *et al.*, 2012). They are also faced with poor modes of transportation that cause delays and frustrate their efforts to access quality healthcare facilities in nearby towns and cities (Schoon, 2013; Pacagnella *et al.*, 2012).

The socioeconomic disparity in society is another challenge affecting the quality of healthcare in South Africa (Mayosi & Benatar, 2014; Harrison, 2009). A large number of pregnant women cannot afford the standard healthcare facilities because these are too expensive for them (Wabiri *et al.*, 2013; Silal *et al.*, 2012).

Adequate healthcare facilities and enabling environments are paramount for the delivery of quality care (Geary *et al.*, 2014; Marten *et al.*, 2014). The South African healthcare system needs comprehensive emergency obstetric care (Silal *et al.*, 2012), equipped neonatal and intensive care units, effective caesarean sections and sufficient blood in the blood bank (Blignaut, Coetzee & Klopper, 2014; Lau *et al.*, 2014) for effective and efficient healthcare delivery for pregnant women. Haskins *et al.* (2014) and Moosa and Gibbs (2014) also comment on the conditions of the healthcare facilities in South Africa. Their studies noted poor management and poor communication as some of the problems affecting healthcare service delivery.

It is important to take note of the MMRs in South Africa in order to ascertain the quality of care delivered to pregnant women. The next section deals with mortality rates among pregnant women in South Africa.

2.2.2.2 Mortality rates among pregnant women

Although the MDG had a mission of decreasing maternal mortality by 75% between 1990 and 2015 (Tuncalp *et al.*, 2014; Pattinson, 2008: 1297), South Africa experienced an increase in the rates of maternal and infant mortality after the inception of the MDG in 1990; the number of maternal deaths quadrupled between 1998 and 2007 (Burton, 2013: 520; Garenne, McCaa & Nacro, 2011: 89-101).

The MMR for South Africa is relatively high (Tsai *et al.*, 2014; Wabiri *et al.*, 2013). In 2007, the MMR was recorded as 625 deaths per 100 000 live births (Silal *et al.*, 2012), while the WHO reported about 300 deaths per 100 000 live births in South Africa in 2013. Wet and Ngubane (2014) confirm an estimate of 350 000 deaths among sub-Saharan pregnant women.

Unsafe abortion is clearly a major cause of high maternal mortality in South Africa (Jacobs & Hornsby, 2014; Jaldesa, 2014), even though there is a significant dearth of research regarding the practice, methods and motives behind the practice of abortion (Constant *et al.*, 2014). Unsafe abortion can be defined as “a procedure for terminating an unwanted pregnancy either by persons

lacking the necessary skills or in an environment lacking the minimal medical standards, or both” (WHO, 2011). Regular incidents of unlawful dumping of fetuses and babies in South Africa are a clear indication that some women are involved in unsafe abortion (Jacobs & Hornby, 2014; Jacobs, Hornsby & Marais, 2014). Maternal mortality and unsafe abortion can be reduced by adequate provision of relevant health information.

With regard to the records of the MMR and infant death rates in South Africa, there is great concern about pregnant women living in the country (Aborigo *et al.*, 2014; Coovadia *et al.*, 2009: 817; Harrison, 2009: 2). Aborigo *et al.* (2014) confirm that the MMR among pregnant women in sub-Saharan Africa is still very high.

2.2.2.3 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 (Matthews *et al.*, 2015; Myer *et al.*, 2015). South Africa is one of the countries with growing numbers of people living with HIV/AIDS (Villar-Loubet *et al.*, 2013; Ferguson *et al.*, 2012; Johnson, 2012). There is, however, free access to antiretroviral treatment (ART) at healthcare facilities to cater for everyone living with HIV/AIDS, pregnant women included (Barron *et al.*, 2013; Clouse *et al.*, 2013). However, there is insufficient information on the number of pregnant women using ART in the healthcare system in South Africa (Clouse *et al.*, 2013; Myer *et al.*, 2012).

The relatively high number of pregnant women infected with HIV/AIDS in South Africa could endanger pregnancy, especially when the ART is not used well. Creation of awareness on the importance of ART for pregnant women with HIV/AIDS could halt the transmission of the virus to the next generation and avert deaths.

South Africa recorded thirty-nine thousand infants infected with HIV at birth in 2011 (UNAIDS, 2012). The Department of Health of the Republic of South Africa (2012) confirm 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. In addition, South Africa recorded 70.4% of maternal deaths in 2011 as occurring as a result of the HIV/AIDS epidemic. Barron *et al.* (2013) and Johnson (2012) believe that in 2016, South Africa will have three million pregnant women living with HIV/AIDS in spite of ART. The HIV/AIDS epidemic among pregnant women is putting pressure on the South African healthcare system (Myer *et al.*, 2015; Black *et al.*, 2014).

Mnyani *et al.* (2014) note the progressive, tremendous efforts of the Joint United Nations Programme on HIV/AIDS (UNAIDS) to eliminate mother-to-child transmission of HIV. According to UNAIDS (2013), progress has been recorded with prevention of mother-to-child transmission (PMTCT); the rate of transmission has been reduced by half since 2009 (Mnyani *et al.*, 2014). Mofenson (2015) and Myer *et al.* (2015) note the elimination of HIV/AIDS transmission to children through breastfeeding globally, including South Africa. With regard to treatment, Schnippel *et al.* (2015) report on delays, interruptions and losses from PMTCT of HIV services during prenatal care in Johannesburg, South Africa. The study shows that out of one hundred and fifty-eight pregnant women diagnosed with HIV during their first prenatal visit, one hundred and thirty-nine commenced ART immediately, while fifty-two women did not return for their treatment for sixty days. Black *et al.* (2014) confirm that timely acceptance of ART at an early stage of pregnancy can prevent vertical transmission of the virus to the developing fetus. Many infected pregnant women in South Africa unfortunately register late for ART (Black *et al.*, 2014: 736-740; Clouse *et al.*, 2013: 451-460).

Negligent behaviour has been recognised among pregnant women living with HIV in South Africa. Clouse *et al.*'s (2013) investigation found that pregnant women living with HIV have an attitude of inconsistency to ART and they further noted a higher drop-out rate among pregnant women than among non-pregnant women with regard to ART.

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; Hoffman *et al.*, 2010).

Pregnant women living with HIV require highly active ART (HAART). HAART is an important therapy for pregnant women to reduce the viral load and prevent mother-to-child-transmission during pregnancy (Clouse *et al.*, 2013; Ferguson *et al.*, 2012). Another challenge facing the effective utilisation of ART among pregnant women is the problem of disintegration (i.e. no unity) between ART services and prenatal care (Myer *et al.*, 2015; Black *et al.*, 2014; Clouse *et al.*, 2013).

A high number of women in their early reproductive years fall victim to HIV/AIDS (Myer *et al.*, 2015; Cooper *et al.*, 2007). Cooper *et al.* (2007) note in a study on reproductive intention among HIV-positive men and women in South Africa that most infected people with HIV compromise

their reproductive involvement and ability because of the fear of transmitting the virus to their spouse or unborn child. Kendall *et al.* (2014) confirm that in South Africa there is a strong association between HIV, reproductive and maternal health.

The role of the healthcare centers and providers is important in reducing the number of pregnant women liable to withdraw from ART (Myer *et al.*, 2012). Apart from the epidemic of AIDS/HIV, South African pregnant women suffer from both communicable and non-communicable diseases. The next section provides detail on comorbidity of other diseases among pregnant women. Because of its sensitivity the data collection for the study will not refer to HIV/AIDS treatment; the preceding discussion is, however, offered to contextualise healthcare concerns in South Africa, as well as some other African countries. Information provision and information monitoring on other issues might also raise awareness of the need for information on HIV/AIDS, specifically treatment for pregnant women.

2.2.2.4 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 (Mayosi *et al.*, 2012; Abegunde *et al.*, 2007). Non-communicable diseases include cardiovascular diseases, cancer, diabetes and respiratory diseases (Watkins *et al.*, 2012; Abegunde *et al.*, 2007). Communicable diseases include tuberculosis, malaria, cholera and measles, to mention a few (Singh, Brown & Rogerson, 2013; Mathad & Gupta, 2012). Only a few studies exist on the challenges of cardiovascular diseases facing African women, especially pregnant women (Sliwa & Mayosi, 2013; Mocumbi & Sliwa, 2012). Cardiovascular diseases among pregnant women are one of the leading causes of maternal mortality, both in developing and developed countries (Watkins *et al.*, 2012). Heart diseases such as rheumatic heart valve disease and untreated congenital heart disease are mostly associated with sub-Saharan women living in poverty (Mocumbi & Sliwa, 2012; Watkins *et al.*, 2012; Liu *et al.*, 2010). Watkins *et al.* (2012) confirm that heart diseases are the cause of about 41% of deaths of pregnant women in South Africa. Sliwa *et al.* (2014) report on a study carried out in a tertiary health center in South Africa on a range of cardiac diseases in pregnant women in low-cost units, using two hundred and twenty-five pregnant women over a period of two years. The study identified an array of diseases ranging from prepartum, peripartum to postpartum ones. A total of one hundred and

fifty-two were diagnosed with a very high-risk disease. The study shows that 32% of the women were diagnosed with congenital heart disease, 26% with valvular heart disease, 27% with cardiomyopathy and 15% with other forms of the disease.

Furthermore, one hundred and ninety-six pregnant women were reported to have prepartum heart failure or symptoms of cardiovascular disease and thirty postpartum heart failure or related symptoms in a study by Sliwa *et al.* (2014). Among the one hundred and fifty-two with very high-risk cardiovascular diseases, nine pregnant women died within six months of the follow-up phase. Hence, an infant mortality rate of 7/1000 live births was recorded in the study. Evidently, women could still die after the pregnancy from non-communicable diseases. Clearly, pregnant women are at very high risk of losing their developing fetus or their own lives when faced with all these challenges (Beauclair *et al.*, 2014; Watkins *et al.*, 2012).

Hypertension and anaemia among pregnant women have been identified as serious health problems that can cause stillbirth and complications during pregnancy (Beauclair *et al.*, 2014; Nandlal *et al.*, 2014). It was noted that in 2008 and 2009, 20 000 pregnancies were lost to stillbirths and out of the 20 000, 20% resulted from hypertensive diseases (Beauclair *et al.*, 2014). The WHO (2011) reports that about 52% of all women living in developing countries have anaemia, while The Saving Mothers (2012) study found that about 30% of pregnant women who died during pregnancy did so as a result of anaemia in South Africa.

Tuberculosis is a major problem among women of reproductive age in both developed and developing countries (Zumla, Bates & Mwaba, 2014). The WHO (2014) found an estimate of 3.3 million new cases of tuberculosis infections among women in 2013, of which 510 000 resulted in death. Uncured tuberculosis can result in maternal mortality of 40% (Zumla, Bates & Mwaba, 2014; Mathad & Gupta, 2012). The WHO (2011) and Tsoka-Gwegweni and Kleinschmidt (2013) found that on a worldwide scale, an estimated 50 million pregnant women are susceptible to malaria infection every year, of which 10 000 lose their lives during pregnancy. Tsoka-Gwegweni and Kleinschmidt (2013) found that there is a low rate of malaria infection in South Africa, even though the health policy on malaria in South Africa is inadequate. Nevertheless, constant monitoring should be embraced to ensure that the rate remains insignificant in future.

2.2.2.5 Impact of social issues on pregnant women

South Africa is one of the developing countries with a high number of unwanted teenage pregnancies and rape (Vries *et al.*, 2014; Jewkes *et al.*, 2010). Teenage pregnancies are on the rise in both developing and developed nations (Mushwana *et al.*, 2015; Taylor *et al.*, 2014). A WHO (2012) study on teenage pregnancy reports an estimated 16 million teenage girls giving birth annually. Mushwana *et al.* (2015) confirm that in 2006 more than 72 000 teenage girls dropped out of school because of unwanted pregnancies in South Africa. The South African government, however, offers child support grants to teenage mothers and their poor caregivers (Udjo, 2014). The outcome of teenage pregnancy has been linked with sexually transmitted diseases, school drop-out and financial insecurity (Sedgh *et al.*, 2015; Taylor *et al.*, 2014). Vries *et al.* (2014) argue that rape is strongly associated with unwanted pregnancy. About 35% of teenage girls fall pregnant at 19 years of age.

Violence and abuse are an integral part of South African society, especially towards women (Durevall & Lindskog, 2015; Christofides *et al.*, 2014). Alcohol abuse, spousal violence and HIV infection were noted in a study as intersecting epidemics among pregnant women in South Africa (Russell, Eaton & Petersen-William, 2013). South Africa is known to be among the countries with the highest rates of fetal alcohol syndrome in the world (Eaton *et al.*, 2014; Devries *et al.*, 2013; Illangasekare *et al.*, 2013).

Anxiety, especially pregnancy-related anxiety, has been associated with negative health outcomes, which affect both the mother and the developing fetus (Brunton *et al.*, 2015; Tsai *et al.*, 2014). Pregnancy sometimes affects the psychosocial well-being of pregnant women because the period brings about increased levels of anxiety, stress and fear (Hutti *et al.*, 2015; Tsai *et al.*, 2014). Hence, to overcome pregnancy-related disorders, communal prenatal care is advised (McDonald *et al.*, 2014; McLean, 2013; Openshaw, Bomela & Pretlove, 2011).

Studies on pregnant women have shown that some of them experience depression during pregnancy (Brunton *et al.*, 2015; Hutti *et al.*, 2015; Illangasekare *et al.*, 2013). Depression can occur both during and after pregnancy; however more attention has been paid to prenatal depression in the literature (Thomas, Komoti & Judd, 2014; Weobong *et al.*, 2014). In spite of the increased number of cases of maternal depression in South Africa (Myer *et al.*, 2015; Mall *et al.*, 2014; Russell, Eaton & Petersen-William, 2013), there is lack of routine screening and

treatment for pregnant women in primary healthcare facilities (Honikman *et al.*, 2012). Rochat *et al.* (2006: 1376) found that depression among pregnant women is closely associated with deadly diseases, especially among rural dwellers in South Africa. Depression often sets in when women are introduced to lifelong treatment and when they lack prenatal care (Black *et al.*, 2014; Ferguson *et al.*, 2012). Depression is closely linked with the use of substance abuse, violence and negative behaviour (Illangasekare *et al.*, 2014; Devries *et al.*, 2013; Russell, Eaton & Petersen-William, 2013).

McLean (2013) argues that providing adequate postnatal care for women after pregnancy is paramount because about 10% to 15% of pregnant women experience postpartum depression. Good mental and social health is also important for the general well-being of the mother and developing fetus (Hutti *et al.*, 2015; McLean, 2013). A number of pregnant women are faced with mood swings, which often result in depression during and after pregnancy (Thomas, Komoti & Judd, 2014; Kim *et al.*, 2013). Hutti *et al.* (2015) found that pregnant women who have previously experienced loss of pregnancy could also fall into a state of depression. A recent study in Cape Town (South Africa) on correlates of lifetime trauma using two hundred and eighty-nine pregnant women showed that 19.8% had been exposed to some form of trauma (Myer *et al.*, 2015).

In South Africa, an estimated 20% to 50% of women have suffered child abuse, spousal violence or violent crime (Myer *et al.*, 2015; Christofides *et al.*, 2014). Jewkes and Morrell (2010) confirm that 55% of South African women have been abused. 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.

2.2.2.6 Women's awareness of facilities and need for care

Creation of awareness of healthcare services and facilities is a necessity at present because of the role shift in the healthcare sector (Adanikin, Onwudiegwu & Akintayo, 2014; Wright, Biya & Chokwe, 2014). The sector is patient-centered and consequently requires patients' involvement in decisions on their health (Dalrymple *et al.*, 2013; Johnson & Case, 2012). Thus, health literacy for pregnant women cannot be over-emphasised (Altin *et al.*, 2014; Korda & Itani, 2013).

Some studies on pregnant women (especially rural dwellers) have noted inadequate awareness among them regarding the benefits of prenatal care, as some of them have the notion of visiting the healthcare facilities only when it is time for labour or delivery or when complications arise (Das & Sarkar, 2014; Lau *et al.*, 2014; Myer & Harrison, 2003). Wennberg *et al.* (2013) found in a study on women's experiences of dietary advice during pregnancy 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 (Aborigo *et al.*, 2014; Beauclair *et al.*, 2014). Funds to cater for various health promotion programmes are inadequate. Tomlinson *et al.* (2014) stress the benefits of incorporating the various health programmes in South Africa rather than taking a vertical approach to achieving better health outcomes, especially among pregnant women. When all health programmes are integrated, more people are likely to benefit from them (Tomlinson *et al.*, 2014).

Exclusive breastfeeding education has been recognised as beneficial for reducing infant mortality and morbidity (Tuthill, Chan & Butler, 2015; Faber *et al.*, 2014; Tuthill *et al.*, 2014). Exclusive breastfeeding (i.e. nourishing of infants with only breast milk until six months of age) can reduce mortality rates among infants under the age of three by 8% (Engebretsen *et al.*, 2014; Faber *et al.*, 2014). Mekuria and Edris (2015) confirm that exclusive breastfeeding can prevent 1.4 million infant deaths globally. Thus, healthcare providers have the responsibility of providing breastfeeding education during prenatal visits (Tuthill, Chan & Butler, 2015; Wright, Biya & Chokwe, 2014). Provision of lactation specialists and information resources at healthcare centers can also be embraced in order to educate pregnant women on the benefits of exclusive breastfeeding (Tuthill, Chan & Butler, 2015; Bass *et al.*, 2014; Wright, Biya & Chokwe, 2014).

Case (2012: 302) 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.

Based on the above background on the literature on healthcare and pregnancy in general and specifically in South Africa, it has been noted that pregnancy brings about physical and psychological changes in women (Hutti *et al.*, 2015, 2011) and triggers a need for pregnancy-related information in order to adjust to the bodily and mental changes (Das & Sarkar, 2014; Song *et al.*, 2013). The studies reviewed in this section show that pregnant women in South

Africa face inadequate healthcare providers, delays in access to healthcare facilities and services, maternal and perinatal mortality, abuse, HIV/AIDS, depression and communicable and non-communicable diseases. This study intends to explore the health information behaviour of women in order to meet their unmet information needs, specifically with regard to means of monitoring information. Although specific details about these issues will not be covered in data collection, the issues were noted and incorporated into the study to give insight into pregnancy and the healthcare system in South Africa. These issues are, however, touched on in Chapter 7 when commenting on answers to the sub-problems.

The next section deals with the reported information behaviour of pregnant women, what information needs are paramount to them to make informed decisions on keeping themselves and their unborn babies safe and services that can assist in the quest for staying informed.

2.3 HEALTH INFORMATION BEHAVIOUR

Health information behaviour is a concept that has been studied by many researchers in the literature on Information Science (Anker *et al.*, 2011; Lambert & Loiselle, 2007). The concept of health information behaviour is, however, evolving partly as a result of the advent of health information technology and the internet (Kim & Syn, 2014; Johnson & Case, 2012: 3) and increased levels of interaction between patients and healthcare providers in order to make decisions on patients' health (Anker *et al.*, 2011), as well as a gradual shift in focus from studying the information behaviour of only professional groups to ordinary people (people from other spheres of life) (Case, 2006; McKenzie, 2003). Technology and the internet promote health information searching by more people in everyday life, for example, through desktop and laptop computers (Cox *et al.*, 2015; Fleming, Vandermause & Shaw, 2014), search engines (Pang *et al.*, 2014; Huberty *et al.*, 2013), smartphones and mobile devices (Kim & Syn, 2014; Tripp *et al.*, 2014; Waring *et al.*, 2014), tablet devices (Burford & Park, 2014; Jayroe & Wolfram, 2012) and SMS (Lau *et al.*, 2014; Dalrymple *et al.*, 2013).

Studies on health information behaviour have emerged over the years (Song *et al.*, 2013; Rees & Bath, 2001; Molem, 1999; Johnson, 1997; Barsevick & Johnson, 1990; Lenz, 1984) and more studies are still emerging on the health information behaviour of various categories of users such as cancer nurses and patients (Johnson & Case, 2012; Fourie, 2008; Fourie & Claasen-Veldsman, 2007) and pregnant women (Chomat *et al.*, 2014; Das & Sarkar, 2014; Das, 2013). In the studies

on health information behaviour, some notable factors that can influence women's information seeking have been identified. The factors include cultural practices, belief systems and ethnicity (Aborigo *et al.*, 2014; Das & Sarkar, 2014; Suggs, Cowdery & Noll, 2010), religion (Farih *et al.*, 2014), level of education (Das & Sarkar, 2014; Wong *et al.*, 2014; Pereboom *et al.*, 2013; Shabi, 2012), gender (Spaderna & Sieverding, 2015), health challenges (Davis, 2014; Fourie, 2012; Fourie & Claasen-Veldsman, 2007), health literacy (Bantan & Abenhaim, 2015; Das & Sarkar, 2014; Wright, Biya & Chokwe, 2014), age (Chomat *et al.*, 2014), language (Chomat *et al.*, 2014) and economic power (Song *et al.*, 2013; Shieh, McDaniel & Ke, 2009).

Johnson and Case (2012) view health information behaviour as a survival tool that can enhance health information provision, has the capacity to remove fear and stress and support psychological well-being that can enable decision making (e.g. in terms of the preferred treatment) on a health problem. Health information behaviour is associated with the gathering and acquisition of health information and knowledge to improve healthy behaviour (Chomat *et al.*, 2014; Dalrymple *et al.*, 2013; Mukherjee & Bawden, 2012). For the purpose of this study, health information behaviour refers to the different activities a woman engages in regarding information needs, information seeking, information retrieval and information use on health issues and promotion.

2.4 INFORMATION BEHAVIOUR OF PREGNANT WOMEN

Relatively few studies have been reported on information behaviour and pregnant women (Song *et al.*, 2013; McKenzie, 2004). Studies that have been noted in Chapter 1 include those of McKenzie (2004, 2003a, 2002), Rooks (1999) and Brown and Press (1997: 117). According to the literature, information behaviour includes the “recognition, expression and formulation of an information need” (Fourie, 2012: 4). Wilson (1999: 429) explains information behaviour as “the totality of human behaviour in relation to sources and channels of information including both active and passive information seeking and information use.” Davis *et al.* (2014) note the influence of the behaviour women engage in during pregnancy as a determinant of the health outcome of the baby. Women's interaction with information during pregnancy cannot be over-emphasised, as Grimes, Forster and Newton (2014) and McKenzie (2003a) found that a sign of being prepared for parenthood is a woman's involvement with relevant arrays of information sources. In spite of women's quest for information, enormous challenges make the information

search process frustrating (Bantan & Abenhaim, 2015; Wennberg *et al.*, 2013). Relationships have also been established between poor health literacy, poverty and negative maternal and child health outcomes (Das & Sarkar, 2014; Song *et al.*, 2013).

The next section intends to explain in more detail the importance of information, information needs, problems experienced, preferences, information seeking and information provision to pregnant women.

2.4.1 Importance of information for pregnant women

Because of the constant rise in infant and maternal death rates (Jacobs & Hornsby, 2014; Jaldesa, 2014), Das (2013) and Papen (2013) found that early provision of health information to pregnant women is needed to reduce MMRs. Song *et al.* (2013) and Lundrigan (1991) confirm that pregnant women need information as soon as they know about their pregnancy.

During pregnancy a woman's body undergoes different forms of change: physical, physiological, psychosocial as well as in immunological make-up (Das, 2013; Rasmussen, Jamieson & Uyeki, 2012). By nature pregnant women become vulnerable and susceptible to all manner of diseases (Olliaro *et al.*, 2015; Madsen *et al.*, 2014). For this reason healthcare providers provide information and offer prescriptions on appropriate medication (Hameen-Anttila *et al.*, 2015) and they advise women on nutrition (Legault & Marquis, 2014; Lucas, Charlton & Yeatman, 2014) in order to protect them from health risks and complications. According to Pereboom *et al.* (2013) many pregnant women suffer from infectious diseases such as toxoplasmosis, listeriosis and cytomegalovirus. Although these diseases are preventable, most pregnant women are unfortunately infected simply because of low levels of information and education, as many of them are not informed adequately by their healthcare providers (Wong *et al.*, 2014; Durand *et al.*, 2010).

Adequate acquisition of information and education tends to equip pregnant women with better communication skills (i.e. to improve their ability regarding what and how to communicate) especially with their healthcare providers (Wiley *et al.*, 2015; Aborigo *et al.*, 2014; Das, 2013). Over the past decades, more emphasis has been placed on patients' active involvement in making decisions on their health, as well as gathering and sharing information with their healthcare providers (Amoah & Appiah-Sakyi, 2013; Anker *et al.*, 2011). Moreover, information increases the state of knowledge of pregnant women, allows them to participate boldly in preventive

healthcare and encourages them to engage in educating other pregnant women on how to prevent avoidable risks and complications (Lau *et al.*, 2014; Blanchard-Rohnen & Siegrist, 2011; Collins, 2007).

A low level of education has been noted as one of the contributing factors increasing the level of mortality and morbidity among poor pregnant women (Aborigo *et al.*, 2014; Arrish, Yeatman & Williamson, 2014). Das and Sarkar (2014) found that disparity exists in the education and socioeconomic status of Indian pregnant women, influencing their behaviour in respect of effective utilisation of healthcare facilities. In their study poor Indian pregnant women sought information on pregnancy from family members and only consulted healthcare providers when complications arose. Das and Sarkar (2014) reveal on the basis of the statistical data from a national family health survey that during their prenatal visits only 20% of poor Indian pregnant women (especially rural dwellers) were provided with information on labour pain, 15% on convulsions and 16% on vaginal bleeding.

Pregnant women and infants are the groups who most need influenza vaccines (Wiley *et al.*, 2015; Wong *et al.*, 2014). Lynch *et al.* (2012) examined data from three cities in the USA in September 2009, using eighteen pregnant women, including recently pregnant ones, and explored their perceptions on influenza vaccines and antiviral medicines during the 2009 H1N1 pandemic. The study reports that the pregnant women had little information on influenza vaccines and antiviral medicines. The study also shows that pregnant women expressed fear about taking the medication during pregnancy, but were willing to accept the treatment and vaccines because the safety of the developing fetus was paramount to them. Statistics were not provided in the study. Lynch *et al.* (2012) further reveal lack of awareness of influenza preventive strategies among pregnant women, which is dangerous for fetal development and increases maternal morbidity and mortality rates (Merk *et al.*, 2014; Madsen *et al.*, 2013; Blanchard-Rohnen & Siegrist, 2011).

Provision of concise information on healthy ways of living can secure the safety of pregnant women (Herbec *et al.*, 2014; Lau *et al.*, 2014). Dalrymple *et al.* (2013) found that the use of SMS is beneficial for educating, disseminating website links (URL: Uniform Resource Locator) on important pregnancy topics and enhancing health information seeking among pregnant women. Payne *et al.* (2014) examined the knowledge, attitudes and practices of midwives regarding

alcohol intake among Australian pregnant women. The study analysed responses from two hundred and forty-five midwives; of these 93.2% reported asking questions on alcohol intake from pregnant women, 99.4% reported providing advice on alcohol intake to pregnant women and 64.2% reported providing information on the effects of alcohol intake during pregnancy to pregnant women. The Australian alcohol guideline declares that abstaining from alcohol is safest for pregnant women (Payne *et al.*, 2014).

Healthcare providers ought to educate and inform pregnant women on the importance of physical, social and emotional well-being during and after pregnancy (Das & Sarkar, 2014; Pereboom *et al.*, 2013; Mamun, *et al.*, 2009), as well as offer care and support (Al-teeq & Al-Rusaies, 2015; Asplin *et al.*, 2014; McKenzie, 2004). Health information experts and librarians are also recommended to assist in the provision of authoritative health information and literacy to pregnant women (Dalrymple *et al.*, 2013; Burnham & Peterson, 2005). In order to provide the required information and education for pregnant women, it is important to explore their needs for information so as to fill the gap in their state of knowledge. The next sub-section explains the information needs of pregnant women in more detail.

2.4.2 Information needs of pregnant women

In the literature Fenwick *et al.* (2015), Das and Sarkar (2014) and Song *et al.* (2013) made it clear that pregnant women have unmet information needs during pregnancy. It is especially important for healthcare providers to pay more attention to pregnant women's expressed and unexpressed information needs (Volpe, 2010; Shenton, 2007).

Information needs entail the desire to make sense of a particular situation or locate information that can assist in bridging a gap in the state of knowledge and proffer solutions to achieve a particular goal (Dervin, 1999). As noted in Chapter 1, it is especially important to provide more explanation of information needs so as to grasp the full essence of the concept; thus, the information needs of a pregnant woman can be expressed when she is trying to make sense of unclear issues on pregnancy or a situation where she is looking for pregnancy-related information on topics about which she does not know enough. An information need can also be referred to as an incomplete state of knowledge (Staiman & Mizzaro, 1998) or anomalous state of knowledge (ASK) (Belkin *et al.*, 1982). Individuals may sometimes find it difficult to express an information need because they do not recognise it as a secondary need (Wilson, 1999: 250).

Taylor (1968) addresses these difficulties in an article classifying information needs into four categories, namely visceral, conscious, formalised and compromised needs. The details of these categories of information needs will not be explained in this study.

A person may be aware or unaware of a need for information (Fourie, 2012; Wilson, 1999; Taylor, 1968) and information needs could be expressed or unexpressed by a person (Fourie, 2012; Volpe, 2010; Shenton, 2007). 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; Taylor, 1968). Volpe (2010) explains an unexpressed information need as an information need that exists in the cognitive space of an information user (who is perhaps unable to act on the need at that moment because of a language barrier) (Davies *et al.*, 2010; Fourie, 2008). Such an information need may only be noticed from the physical expression of an individual, e.g. the tone of voice or bodily expression. On the other hand, 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). Similarly, 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). Wilson *et al.* (2002) and others such as Katopol (2012) and Savolainen (2011) associate needs for information with anxiety and uncertainty. Considering the concerns noted in sections 2.2.2 and 2.2.2.5 on pregnancy from a healthcare point of view, pregnant women may have many unexpressed and unrecognised information needs.

Courtright (2007) and Wilson (2000) argue that an information need may or may not progress to information seeking; Wilson (1999) perceives information needs as secondary needs that arise from physiological, affective or cognitive needs. It is however possible for pregnant women to exhibit unexpressed information needs, i.e. possible information needs that they cannot express or a need they forgot about (Case *et al.*, 2005; Taylor, 1968). In spite of the reality of unexpressed information needs, studies have reported on the expressed information needs of pregnant women; such studies noted information needs as the need for information that women could express without any difficulty (Chomat *et al.*, 2014; Herbec *et al.*, 2014; Wilson, 1999). In the data collection for this study the focus was again on expressed information needs, but the potentially unexpressed and unrecognised information needs were termed dormant information

needs after Wilson (1999), which can be deduced from the earlier discussion in this chapter, e.g. sections 2.2.2. This will also be noted in the concluding chapter(s).

Based on the above discussion, the most important step in meeting the needs of a user (e.g. a patient) is to gain insight into the person's information need(s) (Kakai *et al.*, 2004); these should be expressed, as well as unexpressed information needs, and even dormant (unrecognised) information needs. Strategies can then be developed to provide access to relevant information resources. This would also apply to pregnant women, where the pregnancy as such elicits information needs and influences women in seeking information (Das, 2013; Papen, 2013; Song *et al.*, 2013; McKenzie, 2003).

Literature on pregnant women has shown that they have information needs regarding nutrition (Arrish, Yeatman & Williamson, 2014; Legault & Marquis, 2014), family planning (McKenzie, 2006), total well-being of the fetus (Gao, Larsson & Luo, 2013; Wennberg *et al.*, 2013; Singh *et al.*, 2002), medication (Hameen-Anttila *et al.*, 2015), pre and postnatal care (Lau *et al.*, 2014; Finlayson & Downe, 2013; Openshaw, Bomela & Pretlove, 2011), breastfeeding (Mekuria & Edris, 2015; Tuthill, Chan & Butler, 2015; Engebretsen *et al.*, 2014), health policies (Amaoh & Appiah-Sakyi, 2013), birth facilities (David *et al.*, 2014; Finlayson & Downe, 2013), support against abuse (Groves *et al.*, 2015; Christofides *et al.*, 2014), obstetric danger signals (Hutti *et al.*, 2015; Aborigo *et al.*, 2014), healthy lifestyles (Herbec *et al.*, 2014; Payne *et al.*, 2014), fetal movements (McArdle *et al.*, 2015) and stress management (Thomas, Komoti & Judd, 2014; Weobong *et al.*, 2014). Information on employment opportunities and access to government infrastructure is also of concern for pregnant women (Song *et al.*, 2013; Harrison, 2009).

Some factors have been found to influence the information needs of pregnant women. Chomat *et al.* (2014) and Das and Sarkar (2014) identified economic, educational, marital and health issues (Asplin *et al.*, 2014; Mateus, Maia & Teixeira, 2014; McGrath *et al.*, 2014) 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 *et al.* (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, USA who had survived live births between 2001 and 2003. The result from the

study show 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 in spite of the need for information. On the other hand, among those who did not have an information need on dental care, 41% of the women visited a dentist while 59% did not.

From the literature it appears that pregnant women have some personal information needs, for example on support against abuse, smoking and family problems (Groves *et al.*, 2015; Heaman *et al.*, 2015; Russell, Eaton & Peterson-Williams, 2013; Dooley *et al.*, 2010). Healthcare providers in maternity care can do little about personal problems (Fenwick *et al.*, 2015; Edmonds *et al.*, 2014), but access to information from other resources might be useful (Asiodu *et al.*, 2015; Grimes, Forster & Newton, 2014).

A study by Cormick *et al.* (2012) at Rosario and Mercedes, Argentina involved one hundred and forty-seven pregnant women. Of these women, sixty-three were from Rosario and eighty-four from Mercedes. 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 admitted to receiving mobile text messages during pregnancy and 91% admitted 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 fetal 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.

According to Fenwick *et al.* (2015), pregnant women face challenges of unmet information needs and inadequate support concerning assurance and anxiety during child delivery. Recent studies have noted an increased number of cases of unplanned caesarean sections as a result of unmet information needs that have developed into emotional disorders (Gosh, Yamoah & Pring, 2013; Karlstrom, Lindgren & Hildingsson, 2013). Physical and psychological changes during pregnancy can, however, be treated with medication (Guillory *et al.*, 2014). Hameen-Anttila *et al.* (2015) confirm this in an online-based study using websites mostly used by pregnant women

in the USA, Europe and Australia to satisfy needs for information on medication. The study analysed nine thousand four hundred and eighty-three pregnant women's responses (98.2%); of the sampled population, seven thousand and ninety-two pregnant women (57%) reported the need for information on medication. The groups with the highest need for information on medication were first-time pregnant women, pregnant women with health challenges using medication and those with poor health literacy.

A study by Shieh and Weaver (2011) identified one hundred and thirteen pregnant women attending an inner-city healthcare center. The study compared eighty-two African American and thirty-one Caucasian pregnant women in relation to the perceived importance and need for information, exploring five areas, namely nutrition, exercise, healthy weight gain during pregnancy, rest and prenatal vitamins. Both African American and Caucasian pregnant women regarded the five areas of information needs as pressing and important. African American pregnant women were more interested in rest and healthy weight gain during pregnancy in contrast to Caucasian pregnant women. Exercise education was ranked lowest in terms of information needs. Actually, both African American and Caucasian pregnant women should receive information on exercise because they are both prone to obesity after childbirth (Shieh & Weaver, 2011).

A study in Australia by Thompson *et al.* (2011) on pregnant women's knowledge of obesity revealed that 62.9% of the women had not received any information on the ideal weight gain recommended to pregnant women by their healthcare providers and the implications of obesity for pregnancy and after delivery. According to Thompson *et al.* (2011), 39% of the pregnant women in their study were already obese or overweight and none of the women had prior knowledge of the effects of being obese. Furthermore, two-thirds of the pregnant women had not received any advice from their healthcare providers on the necessity to measure and maintain a particular weight. Thompson *et al.* (2011) and Waring *et al.* (2014) suggest that pregnant women need adequate advice on how to maintain their body mass in order to prevent gaining excessive weight (Manning *et al.*, 2014; Tabarsi *et al.*, 2014). Obesity among pregnant women could lead to complications, stillbirth and caesarean delivery (Chang *et al.*, 2015; Waring *et al.*, 2014). Although most healthcare providers provide advice on health topics, the aspect of weight gain is often left out (Thompson *et al.*, 2011).

2.4.3 Problems experienced by pregnant women

Pregnant women are faced with some challenges in the quest for information to deal with their information needs for health information (Fenwick *et al.*, 2015; Bryant *et al.*, 2014).

Pregnant women use the internet to search for online health information during pregnancy (Bantan & Abenhaim, 2015; Tripp *et al.*, 2014; Waring *et al.*, 2014). Larsson's (2009) study on Swedish pregnant women confirms that they use the internet for health information searching and seek information on the early stages of pregnancy and fetal development. Many pregnant women cannot afford the luxury of electronic devices of communication because of poor income (Song *et al.*, 2013; Cormick *et al.*, 2012; Shieh & Weaver, 2011).

The reliability of health information is a challenge experienced by pregnant women who can afford information technology (IT) devices (Bantan & Abenhaim, 2015; Blanchard-Rohnen & Siegrist, 2011). A study on views expressed on Google concerning vaginal birth after a caesarean section found that the Google search engine was considered to offer reliable and accurate online health information to pregnant women. However, most of the sampled sites on Google offer information that a layperson may not understand because the sites are academic-oriented (Bantan & Abenham, 2015).

Medical websites and blogs offer a wide array of health information to their users, including pregnant women (McArdle *et al.*, 2015; Tripp *et al.*, 2014; Waring *et al.*, 2014). Asiodu *et al.*'s (2015) study on breastfeeding and use of social media using fourteen first-time African American mothers found that they used social media and the internet for monitoring information on fetal development and for receiving support. The study notes that the women experienced problems with gathering information on breastfeeding, and when they got information, they found it difficult to recall. Thus, pregnant women need more information on breastfeeding (Bass, Rodgers & Baker, 2014; Wright, Biya & Chokwe, 2014).

Midwives and maternity healthcare providers are the most often consulted and important sources of information on pregnancy (Asiodu *et al.*, 2015; McArdle *et al.*, 2015; Grimes, Forster & Newton, 2014), but most pregnant women continue to complain about unmet information needs (Fenwick *et al.*, 2015; Das & Sarkar, 2014). The hindrances may occur as a result of poor attitudes of healthcare providers (Silal *et al.*, 2012), the shorter attention span on the part of

pregnant women (Clouse *et al.*, 2013; Wang *et al.*, 2011) or insufficient time to consult with healthcare providers on pressing pregnancy issues (Heaman *et al.*, 2015; McDonald *et al.*, 2014).

Health literacy is a key component in patient-centered healthcare (Altin *et al.*, 2014; Darlymple *et al.*, 2013). Poor health literacy has been noted among pregnant women in developing countries (Wright, Biya & Chokwe, 2014; Mayosi *et al.*, 2012). This is a barrier to seeking and utilizing health information (Hameen-Anttila *et al.*, 2015; Pereboom *et al.*, 2013; Blanchard-Rohnen & Siegrist, 2011). The ability to determine the accuracy and credibility of online information is also a challenge, coupled with poor reading levels and low comprehension of health and medical terms (Wright, Biya & Chokwe, 2014; Dalrymple *et al.*, 2013). Pregnant women often also receive contradictory recommendations or unclear information, which often results in frustration (Wennberg *et al.*, 2015; Grimes, Forster & Newton, 2014; Lagan *et al.*, 2010).

Poor pregnant women in rural areas are faced with the problem of gender inequality (when they have doubts and questions, some societies consider it shameful and embarrassing for a pregnant woman to ask information on pregnancy) because of cultural practices and belief systems (Das & Sarkar, 2014; Das, 2013). Conversely, married women are permitted to ask their spouses and mothers-in-law for health information on pregnancy (Aborigo *et al.*, 2014; Das & Sarkar, 2014). Misconceptions on modern medication have been found to exist among rural dwellers, leading to non-compliance with health information provided by healthcare providers (Aborigo *et al.*, 2014; Das & Sarkar, 2014).

Sometimes pregnant women (those who have a better education) can ascertain the reliability and accuracy of online information based on the adequacy of the references and level of consistency with other information sources (Mukherjee & Bawden, 2012; Larsson, 2009). Mukherjee and Bawden (2012) confirm the accuracy and reliability of online information for their study; Bantan and Abenhaim (2015) also found online health information helpful to pregnant women for making informed and quick decisions.

It is important for healthcare providers to educate pregnant women on relevant health topics and promotion of health (Altin *et al.*, 2015; Asiodu *et al.*, 2015; Darlymple *et al.*, 2013), encourage group prenatal visits (McDonald *et al.*, 2014; Das, 2013), provide preventive healthcare and health literacy (Wright, Biya & Chokwe, 2014; Darlymple *et al.*, 2013) and promote the use of short messages in simple language (Lau *et al.*, 2014; Wright, Biya & Chokwe, 2014). Some

researchers argue that IT companies can offer IT literacy training as well as subsidise the price of mobile devices made available to poor women in rural communities (Lau *et al.*, 2014; Dalrymple *et al.*, 2013; Lynch *et al.*, 2012).

Quality care, personalised information and expression of compassion among healthcare providers are helpful for supporting pregnant women facing personal difficulties (Heaman *et al.*, 2015; Asplin *et al.*, 2014; Durand *et al.*, 2010). A love-filled atmosphere could also promote positive health outcomes, which are essential for the survival of the mother and infant (Aborigo *et al.*, 2014; Davis *et al.*, 2014; Edmond *et al.*, 2014).

Websites for pregnant women, as well as the designs, should be considered. These should be interactive and user-friendly, with clear and reliable information (Bantan & Abenheim, 2015). Asiodu *et al.* (2015) recommend the utilisation of social media as platforms for disseminating information on pregnancy.

2.4.4 Preferences for information channels and sources

Pregnant women use a variety of information sources during pregnancy (Grimes, Forster & Newton, 2014; Huberty *et al.*, 2013; Rodger *et al.*, 2013). A number of studies have reported the use of the internet and mobile phones as tools for promoting health and channels for providing health information to pregnant women (Lau *et al.*, 2014; Waring *et al.*, 2014; Cormick *et al.*, 2012; Lagan *et al.*, 2010). However, insufficient research has been done to determine the effectiveness and efficiency of these technologies in providing health information to pregnant women (Waring *et al.*, 2014; Rodger *et al.*, 2013; Fisher & Clayton, 2012).

A study on pregnant women's interest on healthy weight gain during pregnancy and a mobile application and a website show that 86% of pregnant women are interested in receiving health information (Waring *et al.*, 2014). Hsieh and Brennan (2005: 357) report a study at the Midwest prenatal diagnostic center using ten pregnant women between October 2004 and February 2005. The study investigated the information sources most preferred by pregnant women prior to their prenatal counselling. According to the findings, all the women agreed that they used the internet and e-mail at home and their place of work. Nine out of ten pregnant women confirmed the use of search engines such as Google, Yahoo and MSN to search for and source health information, while four women confirmed the use of the internet to search for prenatal genetic counselling

and information. The information resources preferred and used by these women included pamphlets from the doctor's office, books, internet and electronic newsletters.

Healthcare providers are crucial agents of health information (Asplin *et al.*, 2014). Grimes, Forster and Newton (2014), McKenzie (2004) and Seibold (2003) found healthcare providers such as midwives and general practitioners to be important information channels to pregnant women. Seibold (2003) confirms that midwives organise classes for pregnant women in their clinics and provide books and magazines on pregnancy.

Grimes, Forster and Newton (2014) report on a study that was carried out between November 2010 and January 2011 in a tertiary hospital in Melbourne, Australia on information sources used by pregnant women to meet their information needs during pregnancy. The responses were from three hundred and fifty women in total; the findings revealed that 70% of the pregnant women consulted midwives for information, while 39% used written information supplied by midwives and 61% used the booklets provided during the first prenatal visit (the booklets give information on services, support and self-care provided by the hospital). Only 6% of the women indicated the hospital information center as most preferred source of information.

According to findings from Grimes, Forster and Newton (2014) and Deave, Johnson and Ingram (2008), pregnant women seek information from the internet, books, family members, friends and healthcare providers. A study by Plutzer and Keirse (2012) using six hundred and forty-nine women living in Adelaide explored the most preferred sources of information for first-time pregnant women. The findings showed that 67.8% preferred their parents for health information, while 48.8% preferred their healthcare providers.

Preferences for information sources and channels, however, change over time, especially with first-time mothers (Lau *et al.*, 2014; Plutzer & Keirse, 2012). According to Plutzer and Keirse's study, 78% of the first-time mothers sourced for information from their healthcare providers, 15.5% from parents, 21.7% from close associates and 13% from the internet when their children started going to school. Pregnant women's preferences for information change after pregnancy, also at the end of different stages of parenting.

Socioeconomic factors influence the choice of sources and channels to search for information among pregnant women (Aborigo *et al.*, 2014; Das & Sarkar, 2014). Pregnant women with a high income make significant use of social networks and the internet to search for pregnancy-

related information (Tripp *et al.*, 2014; Waring *et al.*, 2014; Huberty *et al.*, 2013) and advice on parenting topics (Asiodu *et al.*, 2015; Darvill *et al.*, 2010) and to authenticate the advice given to them by healthcare providers (Tripp *et al.*, 2014; Cormick *et al.*, 2011), whereas those who cannot afford IT devices consult family members (Das & Sarkar, 2014; Song *et al.*, 2013). A study by Song *et al.* (2013) confirms that low-income pregnant women depend on family members for health advice and information, and rarely make use of the internet to source information. Low-income pregnant women consult experienced women, watch television, listen to radio programmes (Le *et al.*, 2009) and use audio-visual materials for sourcing pregnancy-related information (Das & Sarkar, 2014; Deave, Johnson & Ingram, 2008). Lau *et al.* (2014) and Cormick *et al.* (2012) note that lower-income pregnant women access information through SMS on their mobile phones.

According to the present patient-centered healthcare policy, it is the responsibility of pregnant women to seek information themselves (McArdle *et al.*, 2015; Das & Sarkar, 2014), as well as to make their topics of interest known while searching for information on the internet (Asiodu *et al.*, 2015; Bantan & Abenham, 2015). Lima-Pereira, Bermudez-Tamayo and Jasienska (2011) recommend that healthcare providers should provide reliable website links (URLs) to pregnant women using the internet, because a study found that about 90% of the pregnant women have no knowledge of cheap (or free) pregnancy-related websites and thus use the expensive ones (Lima-Pereira, Bermudez-Tamayo & Jasienska, 2011). Furthermore, URLs can be delivered via text messages (Dalrymple *et al.*, 2013).

2.4.5 Information seeking and factors affecting information seeking

In addition to what has already been noted regarding choices of channels and sources, this section will focus on other facets of information seeking. Some studies have found that a high number of pregnant women receive health information that does not meet their information needs (Song *et al.*, 2013; Johnson & Case, 2012; Collins, 2007). Socioeconomic factors have been noted to affect the way in which people seek information (Hameen-Anttila *et al.*, 2015; Shieh, McDaniel & Ke, 2009). Kumar, Hoovayya and Ahmed (2014) and Song *et al.* (2013) found that income level and education affect the information seeking behaviour of pregnant women. Regardless of the level of income and education of pregnant women, access to adequate

health information can improve their health and fetal development (McArdle *et al.*, 2015; Aborigo *et al.*, 2014; Das, 2013).

Regional medical ethics (i.e. rules and laws applicable to a particular location) (Vonderheid, Norr & Handler, 2007; Vonderheid, Montgomery & Norr, 2003) and the mother's age are some of the factors that affect the information seeking of pregnant women (Das & Sarkar, 2014; Hsieh & Brennan, 2005). An investigation carried out in Maghreb (Montreal) using fourteen pregnant women to examine the nutrition information seeking behaviour of low-income pregnant women found that environmental factors can influence the information seeking behaviour of pregnant women (Legault & Marquis, 2014), even though there is a significant dearth of research on the adequacy of nutrition information (Lucas, Charlton & Yeatman, 2014). Language barriers can also influence information seeking among pregnant women (Grimes, Forster & Newton, 2014).

Social support and marital status can influence the information seeking behaviour of pregnant women (Guillory *et al.*, 2014). Hameen-Anttila *et al.* (2015) and Guillory *et al.* (2014) argue that pregnant women with supportive spouses or committed partners tend to seek information more often and read articles on the internet, in contrast with those who are not in any relationship. Similarly, negative health outcomes could influence the manner in which they seek for information (Asplin *et al.*, 2014; Silal *et al.*, 2012).

Information searching and gathering are activities that have been noted in information seeking behaviour (Wilson, 2000; Kuhlthau, 1993). Studies by Das and Sarkar (2014), Felter and Bernhardt (2004) and McKenzie (2002, 2004) found that pregnant women search for relevant information throughout pregnancy, although as noted in the previous section, information needs and preferences for channels may change. In addition, pregnant women seek information and gather pregnancy-related information so as to avoid complications and stillbirth (Asiodu *et al.*, 2015; Hutti *et al.*, 2015).

Previous studies have found that pregnant women are active information seekers (Legault & Marquis, 2014; Das, 2013; Papen, 2013; Shieh & Weaver, 2011). Hameen-Anttila *et al.* (2015) found that educated pregnant women with a high income are active seekers of information on medication. Information seeking can include active information seeking (McKenzie, 2004; Wilson, 2000, 1999) and passive information seeking (Wilson 2009; Savolainen, 2007, 1997;

McKenzie, 2003; Erdelez, 1997). Active information seeking has been described by McKenzie (2004) as part of the information seeking behaviour of pregnant women. Brown and Press (1997: 117) suggest that the act of receiving information is an important aspect of American prenatal care centers and most pregnant women regard the act of ensuring that they are informed as essential during pregnancy.

Cormick *et al.* (2012) confirm that pregnant women are high information seekers, as they often consult healthcare providers (Hameen-Anttila *et al.*, 2015; Asplin *et al.*, 2014; McKenzie, 2004), family members (Aborigo *et al.*, 2014; Das & Sarkar, 2014), books and magazines (Grimes, Forster & Newton, 2014), mobile phones and internet websites (Lau *et al.*, 2014; Tripp *et al.*, 2014; Huberty *et al.*, 2013) for health information and health topics. Yeoman (2010) and McKenzie (2003a) stress that pregnant women also engage in passive or non-active information seeking during pregnancy (i.e. receiving information without actively asking or searching for it). Since studies on pregnant women and information seeking have noted that they are active seekers of information, it is noteworthy to provide more insight on information provision for pregnant women.

2.4.6 Provision of information for pregnant women

Health information provision entails the information, education, assurance and advice provided for pregnant women regarding their overall well-being and the developing fetus (Al-Ateeq & Al-Rusaies, 2015; Wennberg *et al.*, 2015; Collins, 2007). This is in contrast to information that they seek on their own. This section deals with information that is proactively provided, as well as information provided from a healthcare provider perspective on request from pregnant women.

Adequate provision of health information is essential for pregnant women because pregnancy is associated with health risks and complications (Hutti *et al.*, 2015; Aborigo *et al.*, 2014). Lau *et al.* (2014) and Collins (2007) note the significance of information provision for making quick informed decisions, health promotion and empowerment. Pregnancy is associated with psychological needs (Herbec *et al.*, 2014; Collins, 2007); thus provision of information can provide the necessary support for meeting psychological needs during pregnancy (Groves *et al.*, 2015; Eaton *et al.*, 2014).

Healthcare providers have been recognised as essential sources of quality health information for pregnant women (Grimes, Forster & Newton, 2014; Neupane & Doku, 2012; McKenzie, 2004). Grimes, Forster and Newton (2014) and Lynch *et al.* (2011) suggest that healthcare providers are useful and responsible for providing the necessary information to fill the communication gap among pregnant women to enable them to make informed decisions on their pregnancies. Healthcare provider-patient relationships exist between midwives and pregnant women for the purpose of advice and reassurance (McArdle *et al.*, 2015; McDonald *et al.*, 2014; McKenzie, 2004). Studies by McArdle *et al.* (2015), Grimes, Forster and Newton (2014) and McKenzie (2004) explain that information exchange occurs between pregnant women and midwives.

Provision of health information on physical exercise during pregnancy is necessary during pregnancy (Waring *et al.*, 2014; Huberty *et al.*, 2013). Clarke and Gross's (2004) study examined the relationship between low-risk pregnancy and recreational activities and explored the beliefs of pregnant women and information sources with regard to physical exercise. According to the findings, 80% reported to enjoy physical exercise, 63% reported being actively involved in formal exercise prior to pregnancy, while 39% engaged in weekly physical exercise but could not continue during pregnancy. In general, none of the women reported increasing their physical exercising after falling pregnant. About 96% reported receiving advice on physical exercise at least once during their pregnancy. Most of the participants used the information they were given on physical exercise.

Pregnant women are faced with the challenge of receiving inadequate medical information as well as unclear advice on how to deal with life-threatening issues during pregnancy (Asplin *et al.*, 2014; Wennberg *et al.*, 2013). Discrepancies have been reported concerning the health information expected to be provided to women during prenatal visits and what they received (Bryant *et al.*, 2014; Collins, 2007). Poor health literacy and poverty have been associated with negative health outcomes (Altin *et al.*, 2015; Kumar *et al.*, 2014). Pregnant women desire support for dealing with different changes associated with pregnancy (Rodger *et al.*, 2013; Rasmussen, Jamieson & Uyeki, 2012), but inadequate support from healthcare providers may influence their use of and reliance on educational materials. Guillory *et al.* (2014) confirm that lack of support is strongly linked with negative health outcomes. Another challenge confronting health information provision to pregnant women is the lack of follow-up on mobile health intervention prevalent in developing countries (Lau *et al.*, 2014; Clouse *et al.*, 2013).

Based on the literature, it is suggested that healthcare providers' role and responsibility including the provision of information should be stated clearly to enable them to perform their duties effectively and efficiently (Asiodu *et al.*, 2015; Collins, 2007). In addition, healthcare providers (e.g. pharmacists) require sound information and knowledge of the factors responsible for pregnant women's medication or recommendations on this (Hameen-Anttila *et al.*, 2015). Since many people are acquainted with the internet, including pregnant women, designing pregnancy-related websites that can encourage pregnant women without support resources is necessary (Guillory *et al.*, 2014; Herbec *et al.*, 2014). Provision of health education for close associates of pregnant women is very important because most pregnant women, as noted in Section 2.4.4, depend on their family members for pregnancy-related information and advice (Aborigo *et al.*, 2014; Das & Sarkar, 2014; Le *et al.*, 2009). Pregnancy triggers the quest or desire to be informed about the different changes the body undergoes. Hence, provision of relevant pregnancy-related health information can positively influence the behaviour of a pregnant woman throughout pregnancy and after pregnancy.

2.5 MODEL OF INFORMATION SEEKING BEHAVIOUR THAT CAN BE APPLIED TO PREGNANCY

According to Case (2012: 134), models form the foundation for developing theories. They can be context-specific, usually represented with the aid of diagrams or illustrations, and can clarify relationships and simplify complex processes (Wilson, 1999). Furthermore, it is expedient for models to be tested because they have both strengths and weaknesses that help in building theories (Bates, 2005). Wilson (1999: 250) defines a model as "a framework for thinking about a problem that may evolve into a statement of the relationships among theoretical propositions." It is important to analyse the models of information behaviour and information seeking to ensure a better grasp of the factors underlying the interaction of an information seeker with information sources and channels.

Many models of information behaviour and information seeking behaviour have been reported in the literature on information science over the years (Johnson & Case, 2012; McKenzie, 2003a). These models include the information behaviour models by Wilson (1999; 1981), information searching by Ellis (1993) and the information search process by Kuhlthau (1993). There are also a few models on health information seeking behaviour, namely health information acquisition by Freimuth, Stein and Kean (1989), the comprehensive information seeking model by Johnson *et*

al. (1995), the expanded conceptual model of information seeking behaviour by Longo (2005) and a two-dimensional model of information practices by McKenzie (2003a).

For the purpose of this study, the McKenzie model of information practices (2003a) was used as a framework for studying the information seeking behaviour of pregnant women. The model is portrayed in Figure 2.1. The McKenzie model was preferred because firstly, apart from active information seeking, it focuses on both non-active information behaviour and ELIS and integrates the two. Secondly, the model was postulated from a qualitative study on pregnant women with multiple pregnancies. Since pregnant women share common and similar experiences during pregnancy (Yeoman, 2010), the model was considered suitable for this study.

McKenzie (2003a) suggests a two-dimensional model of information practices. Her model was formed from a general model by Westbrook (1996, cited by McKenzie, 2003), the information search process model by Kuhlthau (1993), the information search model by Ellis (1993), the information behaviour models by Wilson (1999, 1981) and models of information seeking on the web by Choo *et al.* (2000, 1999). The McKenzie model (2003a) is based on two main intents: first, that information seeking behaviour comprises not only active behaviour (more directed) but also non-active behaviour (less directed). Second, that a constructionist discourse approach is expedient for providing insights into ELIS. However, this study did not adopt a constructionist discourse approach in its analysis, although it acknowledges the value of such an approach. This study (at master's level) employs basic thematic analysis.

According to McKenzie (2003a), many models on information seeking behaviour are cognitive in nature and are created from studies on professionals and scholars. Many existing models on information seeking behaviour lack the capacity to describe ELIS (Wilson, 1999). Hence, in providing insights into ELIS, a social context is imperative.

As mentioned earlier, the McKenzie model was developed from an in-depth study on nineteen Canadian pregnant women with multiple pregnancies (twins) using constructionist discourse analysis in order to describe their accounts of information practices. The study made use of semi-structured interviews and diary data collection techniques to elicit the women's varied accounts of information practices. In the accounts, the pregnant women made known their current and future needs. The analysis of ELIS was grounded on accounts of each participant's information seeking and not on mere observation of events in their lives. The model shows that participants

encountered some barriers in identifying relevant information sources. Based on the accounts of the pregnant women, McKenzie (2003a) identified four modes of information practices, namely active information seeking, active scanning, non-directed monitoring and by proxy information seeking and two-stage information processes, namely connecting and interacting. McKenzie (2003a: 25-26) found that the “information practices may be used as counter-strategies in the face of connection and communication barriers.”

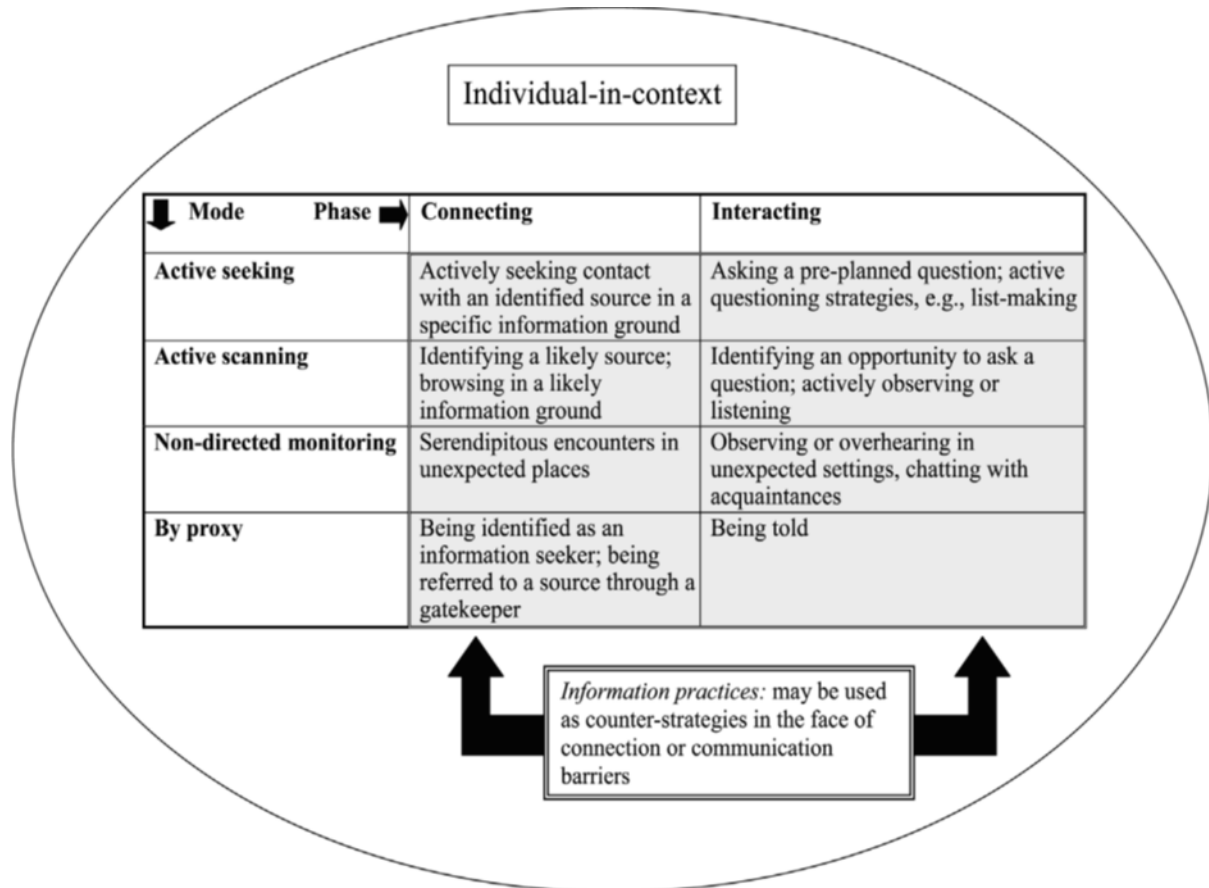


Figure 2. 1: McKenzie’s two-dimensional model of information practices (2003a: 26)

The first mode begins with active seeking; active seeking involves participants’ active involvement in the search for information, ranging from pre-set questions to list-making from known information sources (Wilson, 1997). It can also be referred to as formal search for information from earlier recognised sources (Choo *et al.*, 2000). The second mode involves active scanning; active scanning involves semi-active surfing or scanning in a possible location, e.g. a healthcare provider’s office or bookstores. As an information practice, this involves taking note of information passively, e.g. through listening to documentaries on pregnancy (Erdelez,

1997; Wilson, 1997). The third mode concerns non-directed monitoring; this is based on an account of a participant's unexpected discovery of information in an unlikely place or through the monitoring of information sources and channels (Savolainen, 2007; Erdelez, 1999; Wilson, 1997). Lastly, the fourth mode, by proxy, occurs when information is acquired through the help of a mediator or intermediary (Erdelez & Rioux, 2000; Erdelez, 1999). The mediator can make use of active seeking, or active scanning, or non-directed monitoring information practices to promote information seeking by proxy.

In Figure 2.1 the model distinguishes two processes, namely making connections and interacting with sources. Making connections deals with the “barriers and practices” that occur when establishing connections with potential information sources or possible information grounds directly or through an intermediary, whereas interacting with sources deals with the “barriers and practices” that occur during the process of interacting with information sources after the events of identification and interaction.

The modes of information seeking presented in the model can translate into either of the two information processes. When considered together, the modes and processes present a flexible model of information practices between the information seeker and social environment, taking discursive actions into consideration (Yeoman, 2010; Tuominen & Savolainen, 1997). According to McKenzie (2003), the participants' information practices are seen as flexible in nature (happening rapidly) through the different stages in which they are involved. She thus developed this two-stage model in order to capture the richness of the participants' accounts to depict the flexible nature of the information practices and processes simultaneously. Some challenges were, however, encountered in developing the model of information practices, especially in making a clear distinction between active and non-active information seeking (McKenzie, 2003a: 25-27).

Positioning theory

McKenzie (2004) uses positioning theory to describe the relationship between midwives and pregnant women in clinical contexts (social) and states that different kinds of information behaviour are shown at healthcare centers when time is spent there. The information behaviour includes active seeking, serendipitous encountering, active scanning and proxy, i.e. interaction with information through an intermediary- as also noted in the preceding section (McKenzie, 2003; McKenzie, 2004: 685). Positioning theory offers a research-based framework for

understanding the discursive position of the information seeker in a social context (the ideal setting to observe the information seeking behaviour of pregnant women, including interaction with the healthcare providers in a clinical environment) (McKenzie, 2004: 685).

Positions have the capacity to influence the information seeking behaviour among a group of people; it tends to affect the flow or exchange of information and expose the needs associated with each person in a group (McKenzie, 2004: 685). Positions and positioning theory offer a rich social context capable of revealing the information needs and information seeking of a person or group of persons, which are usually deduced from their interactional practices, such as chatting (McKenzie, 2004). According to McKenzie (2004) “positioning theory is useful for studying the relationships between interactional practices and information seeking.” Hence, the positions of patients in a certain clinical setting can influence their information seeking, especially with their healthcare providers. Positions reveal the information needs and information seeking of a group of persons in a social context (in this case clinical context). Thus, to gain full understanding of pregnant women’s information behaviour for this study, the data was gathered from two medical practices of gynaecologists.

2.6 CONCLUSION

Studies on pregnant women’s information seeking behaviour show that they are involved in both active and non-active information seeking in order to meet their current and future information needs during pregnancy (Huberty *et al.*, 2013; McKenzie, 2004, 2003). Often their information needs are not met (Das & Sarkar, 2014; Song *et al.*, 2013). As is seen from the model of McKenzie (2003), pregnant women use active information seeking from well-known sources, active scanning in familiar information grounds, non-directed monitoring in likely places and information seeking by proxy. It is especially important to take the information needs of pregnant women into consideration in terms of government policies of the various arms of government and health sectors. Healthcare providers ought to identify and strive to meet the needs of pregnant women because by nature pregnancy triggers information seeking in women to enable them to make informed decisions about their health and fetus (Asiodu *et al.*, 2015; Asplin *et al.*, 2014; McKenzie, 2002).

This chapter addressed the literature analysis of healthcare in context, pregnancy and healthcare, pregnancy and healthcare in South Africa, health information behaviour, information behaviour

of pregnant women, importance of information, information needs, problems experienced, preferences for information channels and sources, provision of information for pregnant women and a model of information seeking behaviour that can be applied to pregnancy. The content of this chapter will inform the choice of research methods, a research framework and the questions included in the instruments for data collection.

The next chapter deals with the relevance and benefits of CAS and information monitoring for pregnant women concerning meeting their information needs.

CHAPTER 3

CURRENT AWARENESS SERVICES AND INFORMATION MONITORING

3.1 INTRODUCTION

It is increasingly difficult to stay abreast with current information simply because of the challenges of information overload (Witman & Stern, 2014; Xu, 2012), insufficient ability and time to keep track of all relevant information (Hughes & Glueckert, 2014: 29-38; Glusker, 2013) as well as the lack of a universal method to stay abreast with new information (Barr, 2006: 14-16). This chapter intends to explore the concept of CAS and information monitoring in more detail, examine the benefits and relevance to pregnant women and share insights on how pregnant women can use CAS available on the internet to keep track of new health information that can fulfil their information needs.

As explained in Chapter 1, internet CAS are services that can assist users to stay abreast with new information in any fields of interest (Kiscaden, 2014; Fourie & Claasen-Veldman, 2007). Many studies on pregnant women, as noted in Chapter 2, have found they are faced with problems of inadequate information, specifically on pregnancy topics (Aborigo *et al.*, 2014; Lau *et al.*, 2014; Pereboom *et al.*, 2013; Openshaw, Bomela & Pretlove, 2011), as well as many other unmet information needs (Fenwick *et al.*, 2015; Das & Sarkar, 2014; Song *et al.*, 2013).

Recent studies on pregnant women, as also noted in Chapter 2, confirmed their pressing information needs during pregnancy, e.g. needs for information on health policies regarding maternity care (Amoah & Appiah-Sakyi, 2013), information on making decisions on healthcare facilities (Moosa & Gibbs, 2014; Thompson & Wojcieszek, 2012), nutrition (Eaton *et al.*, 2014; Legault & Marquis, 2014), obstetric danger signs (Hutti *et al.*, 2015; Aborigo *et al.*, 2014), mental health information (Akena *et al.*, 2015; Tsai *et al.*, 2014), support against abuse (Groves *et al.*, 2015; Eaton *et al.*, 2014), medication (Hameen-Anttila *et al.*, 2015; Jones *et al.*, 2015) and support against unhealthy lifestyles (Herbec *et al.*, 2014; Payne *et al.*, 2014).

As explained in Chapter 1, the purpose of this study is to determine the information behaviour of pregnant women regarding CAS and information monitoring, i.e. the need to stay abreast of new

information regarding specific information needs. This chapter will address the CAS and information monitoring relevant to pregnant women. The chapter is divided into six sections. Section one briefly summarises the background on CAS and information monitoring in addition to what was noted in Chapter 1, section two briefly recaptures the meaning of key concepts explained in Chapter 1, section three reports types of CAS, section four explores the information seeking behaviour models that refer to information monitoring and that hold value for a study with pregnant women, section five briefly reports on the value of CAS and information monitoring for pregnant women, and section six highlights the profiling of CAS for pregnant women based on the literature review, with specific reference to staying abreast with new information and what is available on the internet.

3.2 BACKGROUND ON CURRENT AWARENESS SERVICES

In the previous chapter it has been shown that pregnant women consult a range of information sources (Das & Sarkar, 2014; Grimes, Forster & Newton, 2014). A need to stay abreast with current health information has also been noted (Waring *et al.*, 2014; Pereboom *et al.*, 2013). Thus, it is important to explore the concept of CAS and information monitoring in more detail than in Chapter 1.

CAS have been around for many years (Xu, 2012; Fourie, 2003). These services were offered mainly by librarians and information professionals for the sole purpose of providing their users with new publications in their various fields or subjects (Barr, 2006; Cooke, 2000). In the early days, CAS were offered traditionally through accession lists, newspaper clippings, indexing and abstracting of bulletins and display of new books (Mahesh & Gupta, 2008; Barr, 2006; Fourie, 2003). Around the middle of the 19th century, H.P. Luhn made reference to the use of computers for CAS and in 1958, Luhn suggested the first use of electronic systems for carrying out CAS. SDI was the earliest electronic system adopted for recognising users' needs and disseminating new information to users (Hughes & Glueckert, 2014; Xu, 2012). Many information centers adopted the use of CAS for meeting their users' information needs (Xu, 2012).

For more than two decades there has been a shift from traditional CAS to internet CAS due to the advent of technology and the worldwide web (WWW) (Mahesh & Gupta, 2008; Fourie, 2003; Rowley, 1998). With the influx of electronic devices everywhere, CAS are currently also offered on more convenient devices, such as mobile devices (Tripp *et al.*, 2014; Waring *et al.*, 2014;

Cormick *et al.*, 2012) and tablets (Burford & Park, 2014; Jayroe & Wolfram, 2012). The potential of using CAS is thus increasing through technological developments and ease of access through multiple devices.

In the early days of CAS, the service was offered for the purpose of supporting the research of scientists and technologists (Barr, 2006; Kemp, 1979) gradually extending to professional work groups such as oncology nurses (Fourie & Bakker, 2009; Fourie & Classen-Veldsman, 2007), dentists (Hughes & Glueckert, 2014) and medical doctors (Witman & Stern, 2014). Kiscaden (2014) and Johnson, Osmond and Holz (2009) note the delivery of CAS through push technology such as e-mail, RSS feeds and social bookmarking tools to users from all walks of life. Hence, CAS can cater for the information that users consider useful in everyday life, including healthcare and health conditions.

Access to more information promoted by technology has caused a change in the scope, topics and information sources covered by CAS (Witman & Stern, 2014; Fourie & Claasen-Veldsman, 2007). CAS is providing information on more topics, as well as broader scopes through different kinds of information sources to enable users to keep track of new information. CAS is advantageous through the internet because of their ability to provide cheap and convenient new information to their users (Johnson, Osmond & Holz, 2009; Fourie, 2003).

3.2.1 From traditional to internet services

Many studies on CAS have established that people from all walks of life are struggling to stay up to date with relevant information; it is almost impossible to keep track of all the relevant information for one's benefit (Kern & Mu, 2011; Xu, 2012; Strayer *et al.*, 2010; Johnson, Osmond & Holz, 2009). People often face information overload (Kern & Mu, 2011; Strayer *et al.*, 2010). Technology through the internet is constantly promoting the display of mega-volumes of information, leading to information overload (Kiscaden, 2014; Witman & Stern, 2014). Some researchers in the fields of Library and Information Science have reviewed the term information overload: Xu (2012) refer to it as an information tsunami; Kern and Mu (2011) regard it as an information flood, while Strayer *et al.* (2010) refer to information overload as a torrent of information. Information overload is the result of the enormous number of publications made available on different websites, which can cause burn-out and despair for information users (Monie & Clark, 2013; Fourie, 2007, 2003). CAS can add to information overload, or can help

people to be more selective (if used appropriately) in the information they monitor. CAS can support and save their users from sinking in information floods if used appropriately (Kern & Mu, 2011).

3.2.2 Value vs pitfalls of current awareness services and information monitoring

Having stated the reality of information overload as a pitfall of CAS, CAS also offer many benefits, partially noted in the preceding section. Apart from staying abreast with current information, developments, research projects, trends, news etc., Fourie (2003: 186) reports that CAS can offer aesthetic pleasure to their users by creating a pleasurable environment for monitoring interesting topics such as horoscopes, daily or weekly comedies, weather forecasts and travel information.

As noted in the preceding section, internet CAS offer convenient, easy and free access to information to people from all walks of life. They can address any topic, on any medium. They allow people to stay abreast of new information, new developments, new inventions and new trends. Studies on CAS have recognised the tenacity of CAS to keep their users informed and updated (Hughes & Glueckert, 2014; Kidcaden, 2014; Kern & Mu, 2011; Mahesh & Gupta, 2008; Fourie, 2003). They can thus also be of value to pregnant women. Although the use of CAS by pregnant women is associated with fulfilling their information needs and information seeking, these services can also create an atmosphere that is favourable for relaxation and pleasure, such as health comics. These might be especially beneficial to pregnant women's health (taking their social and emotional state of well-being into consideration). Information monitoring (access to new information on an on-going base) can offer patients such as pregnant women and other people health information on an individual basis (Hughes & Glueckert, 2014; Fourie & Classen-Veldsman, 2007). The internet has been proven to be a vital source of arrays of information in this regard (Adolfsson *et al.*, 2014; Waring *et al.*, 2014; Huberty *et al.*, 2013) and if coupled with the immense possibility associated with the use of electronic devices (Lau *et al.*, 2014; Tripp *et al.*, 2014), information monitoring based on internet resources can be a very useful source to monitor new information.

Patient-led healthcare, which is a result of a change in patient-healthcare provider relationships in terms of roles and responsibilities (Appiah-Sakyi, 2013; Johnson & Case, 2012), is causing patients in everyday life to become more proactive in decisions regarding their health (Amoah &

Appiah-Sakyi, 2013; Song *et al.*, 2013). This need can be supported by CAS and information monitoring (i.e. the need for health policies on maternal healthcare, as explained in section 2.4.2).

Johnson, Osmond and Holz (2009) highlight some of the problems users and information professionals face in keeping up to date in an electronic age, such as time taken to browse that requires a person's full attention, information overload, and expertise.

3.3 TYPES OF CURRENT AWARENESS SERVICES

CAS can be classified based on firstly in-house or external use, secondly formal or informal use, thirdly method of delivery and lastly the cost involved as profit or non-profit making (free of charge) (Fourie, 2001: 288-289). CAS are not always specifically designed for target groups such as pregnant women; "these services are not tailor-made for specific target groups nor do they support their specific needs; they have a more general target audience" (Fourie, 1999: 382). This applies mostly to internet CAS and not all CAS offered, e.g. by libraries and subscription to database services (where the terms selective dissemination of information or alerts are mostly used).

A number of studies have noted examples of CAS available via the internet (Hughes & Glueckert, 2014; Witman & Stern, 2014; Glusker, 2013; Monie & Clark, 2013; Xu, 2012; Fourie & Claasen-Veldsman, 2007). Examples of CAS include electronic tables of contents (TOC), electronic newsletters, online discussion groups, weblog services, really simple syndication (RSS) and social bookmarking tools (Hughes & Glueckert, 2014; Lin & Marcus, 2013; Kern & Mu, 2011; Johnson, Osmond & Holz, 2009; Hayward-Wright, 2008; Cooke, 2006).

Studies on pregnant women have found that some women do make use of services and resources for staying abreast with pregnancy-related information and advice (Lau *et al.*, 2014; Wright, Biya & Chokwe, 2014). These studies noted the use of mobile devices and SMS for keeping pregnant women informed.

Of the available types of CAS that have been reported, especially the following are of potential value for pregnant women: TOC services and electronic notification from TOC, e-newsletters, e-zines, website notification services, blogs, intelligent agents, book alerting services, online discussion groups or forums, news filtering services and e-mail notification services. These types

of CAS are briefly explained in more detail; they are also reconsidered in Chapter 5 after analysing data from the empirical component:

1. **Electronic tables of content:** An electronic TOC lists the articles in the latest issue of a journal or magazine, which might include topics in which a person (i.e. the subscriber to the TOC) is interested (Hughes & Glueckert, 2014; Glusker, 2013; Monie & Clark, 2013). Fourie (2007) reveals two ways in which TOC can be used, namely periodic searching of the journal's website for recent articles or the latest edition, as well as subscribing to the TOC to be notified through e-mails or RSS feeds. Such an e-mail can include bibliographic details such as title, author, year of publication and abstracts. Subscribing to the TOC services of magazines and journals is (mostly) free, except when subscribing to services specialising in TOC services such as *EbscoHost's Health Source: Nursing/Academic edition or Health Source: Consumer Edition and Medline*. Examples of scholarly journals with TOC services, including publications on pregnancy, are the *South African Medical Journal*, *South African Journal of Obstetrics and Gynaecology* and *Healthcare SA Gesondheid*. Electronic TOC services are also available for popular health magazines such as *Your Pregnancy* or *Mamas and Papas*. Scholarly journals might be preferred by women with a higher education or background in healthcare, or with training in healthcare, such as nurses or dietitians.
2. **Electronic newsletters:** Electronic newsletters are informal electronic publications that offer useful information on a given subject of interest for a particular group of people. Electronic newsletters can offer information on a variety of subjects for its targeted audience. It can be provided through e-mail notification or RSS feeds and is often available free of charge (Witman & Stern, 2014). Fourie (2007: 43) notes that electronic newsletters are sometimes only available to the members of a society or organisation, healthcare societies or organisations, as well as pharmaceutical companies. Organisations for patient groups can make free electronic newsletters available to pregnant women as patients. Examples of electronic newsletters relevant to pregnant women include *Mamas and Papas* newsletters, *Your Pregnancy* newsletters and *The Mother* newsletters. More detail on web addresses of all examples can be found in Appendix G.

3. **Electronic news alerts:** An electronic news alert is a form of push technology that notifies subscribers of interesting information and news. It is usually sent through e-mail or RSS feeds. Electronic news alerts provide users with the latest news on different subjects ranging from daily and weekly news to news specifically on health issues. Women can subscribe to news services such as *Health 24*, *News 24*, *Fox News* or newspapers such as *News Wall South Africa*, or *Pretoria News* (the last three examples apply to women who are interested in staying abreast with daily news). Health-related news services relevant to pregnant women include *Medical News Today*, *Medic Alert*, *Health 24*, *Women 24* and *Parent 24*. A search engine alert can also be set up for specific topics such as the Zika virus, miscarriages or multiple pregnancies. Examples of search engine alerts include *Yahoo* and *Google Alert*. More detail on web addresses of all examples can be found in Appendix G.
4. **Electronic notification systems:** Electronic notification systems are electronic communication agents that enable subscribers to stay abreast of new information; they permit people such as pregnant women to subscribe and receive electronic notifications through e-mail and RSS feeds. Electronic notification systems differ from electronic news alert in terms of its scope. Electronic news alerts are specific to daily or weekly news while electronic notification systems updates its users on varieties of information. Examples of electronic notification systems relevant for pregnant women include e-calendar reminders (useful for appointments with gynaecologists), weather alert, news alerts, e.g. on breaking news and transportation alerts. Specific examples are mentioned in Appendix G.
5. **Book alerting services:** A book alerting service is a form of CAS that provides notification of new book titles according to the user's topic(s) of interest and/or previous purchases. It delivers notices of book announcements and could also show the TOC of the new books. Examples of book titles relevant to pregnant women that can be delivered through an online book service such as Amazon.com or Barnes and Noble are *Pregnancy for Dummies*, *The Pregnancy Book*, *Natural Hospital Birth*, *The New Experience of Child*, and *The Female Pelvis Anatomy and Exercises*.
6. **E-zines:** E-zines are electronic periodicals or publications that provide information on specific or general subject matter. They are cheap and readily available on the internet to

provide useful information to users. Some e-zines are available free on the internet, while some can be accessed through monthly subscription. Examples of e-zines relevant for pregnant women include *Preggi Bellies*, *Your Pregnancy*, *Your Baby*, *Mamas and Papas*, and *Pregnancy and Newborn*. E-zines are quite different from e-newsletters in terms of scope and the details of subjects being discussed; however, both are available free of charge. More details on web addresses are listed in Appendix G.

7. **Personalised web pages:** Personalised web pages are “customised services” or web pages that update their users with useful information on a specific or general topic of interest. They can also be used to supply information of a lighter nature, such as horoscopes, jokes of the day and news of the day. Examples of personalised web pages relevant for pregnant women include Bounty Pregnancy Center.
8. **Online discussion forums or groups:** Discussion groups can serve the purpose of providing current information to their subscribers. Important issues are raised and users can add their comments. Such a group allows for asynchronous communication among subscribers. Online discussion forums are online communication and networking spaces; they have the capacity to facilitate information sharing between members of a particular group. In that way, members can post questions or information and receive answers to their questions (Fourie & Claasen-Veldsman, 2007; Harman & Koohang, 2005). Examples of online discussion groups relevant for pregnant women include Moomie, Calorababy, and Your Parenting. More detail on addresses is provided in Appendix G.
9. **Weblogs:** Weblogs are websites that provide concise and quickly readable information on different topics of interest. Information on weblogs is presented in reversed chronological order, with interactive features such as the opportunity to comment on a particular topic or subject matter. The contents on the blog can be moved from the host server to the user server even at a later date (Hayward-Wright, 2009). A weblog allows for flexible use, as information can be reposted or shared with other users. Weblogs can provide updates on topics and can provide links to other websites for their users. Lin and Marcus (2013) and Hayward-Wright (2009) note the importance of providing healthcare professionals with CAS using blogs and specifically subject-based blogs. This can also have value for pregnant women. Examples of weblogs relevant for pregnant women

include Your Pregnancy blog, The Mother blog, You, Baby and I blog. Web addresses are provided in Appendix G.

10. **RSS feeds alerts:** RSS feeds are automated tools that alert subscribers to new information from websites, blogs and article and news databases. It is a form of push technology that disseminates information such as news and research findings based on selected topics of interest. RSS feeds can also manage information for subscribers by gathering relevant information from internet sources as well as serve as a reminder and notification system to their users. RSS feeds can help pregnant women to stay abreast with new information simply by mapping up and creating alerts on new topics to users. RSS feeds can provide rich sources of current information that has been added on different websites and weblogs based on the selected feed topics of interest using eXtensible markup language (Kiscaden, 2014; Cooke, 2006). Example of RSS feed alerts relevant for pregnant women include Fit Pregnancy and Medline Plus. More detail on addresses is provided in Appendix G.

11. **Social bookmarking services:** This is a form of push technology that allows subscribers to take note of new information based on postings from other people sharing information on their topics of interest. A social bookmarking tool can act as a current awareness service for pregnant women based on the sharing of links to websites with others, for example new information on weblogs and websites. Social bookmark sites can also offer search options for quick access to relevant information (Kern & Mu, 2011). An example of a social bookmarking service relevant to pregnant women is Pregnancy Services. Details on the web address are provided in Appendix G.

3.4 INFORMATION SEEKING BEHAVIOUR MODELS THAT REFER TO INFORMATION MONITORING

Studies on pregnant women have explored models of information behaviour and information seeking behaviour, for example the two-dimensional model of information practices (McKenzie, 2003) discussed in Chapter 2. This section will be discussing models that mention information monitoring. Among the models of information seeking behaviour in the literature of Information Science, Ellis's model of information seeking (1993) identified the process of information monitoring as an important information searching activity process. According to Ellis (1993:

482-483) “information monitoring refers to maintaining awareness of developments in a field through the monitoring of particular sources.”

The general model of information seeking of professionals by Leckie *et al.* (1996: 180) also refers to awareness of information (which might imply information monitoring) as “direct or indirect knowledge of various information sources (whether a colleague, an online database or a handbook)”.

A non-linear model of information seeking behaviour by Foster (2004) classifies information seeking behaviour into three categories or core processes, namely opening, orientation and consolidation. The opening core process of information seeking identifies monitoring of information as one of the information seeking activities.

An integrated model of browsing and searching by Choo, Detlor and Turnbull (2000) notes four key modes of information seeking on the web, namely undirected viewing, conditioned viewing, informal search and formal search. Conditioned viewing, informal search and formal search modes recognise information monitoring as an important information seeking activity on the web.

Information monitoring needs to be included in the theoretical framework that will guide this study. Monitoring of information also features in McKenzie’s (2003a) two-dimensional model of information practices (*see Figure 2.1*)

3.5 VALUE OF CURRENT AWARENESS SERVICES AND INFORMATION MONITORING FOR PREGNANT WOMEN

The problems pregnant women face in accessing information, their unmet information needs (Fenwick *et al.*, 2015; Das & Sarkar, 2014; Song *et al.*, 2013), and needs to note new information (Hameen-Anttila *et al.*, 2015; Grimes, Forster & Newton, 2014) have been noted in earlier sections and by many other researchers as well. Based on advantages of CAS via the internet noted earlier, CAS and information monitoring hold potential value for pregnant women in various ways. It includes the issues noted in sections 3.5.1- 3.5.9.

3.5.1 Quick and easy notification of new health information across geographic boundaries

It takes time to identify appropriate CAS (Johnson, Osmond & Holz, 2009; Fourie, 2001), and sometimes to set up a profile. For example, when a recipient subscribes to *South African Medical*

Journal she is provided and updated with alerts or notifications on the subject as soon as new information becomes available. With internet CAS, there are no geographic barriers (Waring *et al.*, 2014; Huberty *et al.*, 2013), unlike with traditional CAS (such as display of new books, and bulletin).

3.5.2 Free and easy access to information

Socioeconomic factors affect the information seeking of pregnant women (Asplin *et al.*, 2014; Das & Sarkar, 2014). CAS are thus beneficial for providing free and easy access to information, since they are available free of charge. Internet CAS are easy to access from anywhere in the world on condition that the recipient has the means and skills to access the internet. Mobile technology and apps have also created an easier and accessible means of providing recipients with new information and updates. CAS can further be enhanced by using social network services such as Facebook, Twitter and Blogs (Johnson, Osmond & Holz, 2009), which can all be accessed with mobile devices. Examples of CAS include e-zines, electronic news alerts, electronic TOC and electronic newsletters (Hughes & Glueckert, 2014; Glusker, 2013).

3.5.3 Access to constant social and emotional support in addition to factual information

Pregnant women need emotional support during pregnancy to deal with unexpected negative events associated with pregnancy (McLean, 2013). Complications and perinatal loss (Hutti *et al.*, 2015; Cote Arsenault *et al.*, 2014), an unexpected caesarean section (Gosh, Yamoah & Pring, 2013; Karlstrom, Lindgren & Hidingson, 2013), abusive relationships (Groves *et al.*, 2015), unhealthy behaviour (Herbec *et al.*, 2014), depression and anxiety (Thomas, Komoti & Judd, 2014; Tsai *et al.*, 2014) are some of the noted negative events faced by pregnant women. CAS, such as weblogs, could offer emotional support, advice, reassurance and other mothers' experience to pregnant women to complement the factual information. They also have the capacity to provide new updates on pregnancy issues and provide answers to disturbing questions.

3.5.4 Reduced information overload if handled appropriately

CAS are offered on a continuous basis, hence could result in information overload if not handled appropriately; however, when subscribers handle the feeds from CAS meticulously (e.g. by deleting information that is not useful regularly, as well as being specific about topics of interest

to be updated on), it could reduce information overload (Hughes & Glueckert, 2014; Monie & Clarke, 2013; Xu, 2012; Fourie, 2003).

3.5.5 Personal information management

CAS can assist pregnant women with collection and organisation of information according to their personal needs and preferences for future reference, e.g. Cloud storing and My Libraries (Jones *et al.*, 2015; Prottzman, 2005). The organised folder could promote information sharing with others (Fourie, 2011) and permit appropriate management of information in order to function well as a parent, employee, student or spouse (Stewart, Basic & Erdelez, 2012; Zhou *et al.*, 2012; Fourie, 2011).

3.5.6 Staying abreast of career-related information

Pregnant women with formal education tend to seek more information actively (Hameen-Anttila *et al.*, 2015; Shieh & Weaver, 2011; McKenzie, 2004, 2003a). After pregnancy, they might need to further their careers. Subscription to appropriate CAS can provide pregnant women with new information and developments regarding their careers and fields of specialisation (Fourie & Claasen-Veldsman, 2007). Song *et al.* (2013) confirm that pregnant women seek career-related information during pregnancy.

3.5.7 Taking note of daily events and trends

Literature on pregnant women has noted that apart from seeking health information, they also seek information on everyday life issues (Yeoman, 2010; McKenzie, 2003a). Even though it has not been noted, CAS might be useful in this regard for informing pregnant women about daily news, events and trends.

3.5.8 Receiving information customised to individual interests and needs

Studies on pregnancy have reported problems with stress and depression (Hutti *et al.*, 2015; Illangasekare *et al.*, 2013; Hutti *et al.*, 2011), concern about gaining weight (Waring *et al.*, 2014; Shieh & Weaver, 2011), and dealing with hypertension (Beauclair *et al.*, 2014; Nandlal *et al.*, 2014). CAS can provide the opportunity to subscribe to a service that can provide notification of new information on such topics when it becomes available, e.g. setting up a PubMed search profile on any of these issues or setting up a search engine alert. For such services a profile of interest, sometimes also referred to as a search profile, would be necessary (Fourie, 2001). Apart

from customised subscription to CAS, pregnant women experiencing symptoms such as stress or depression might benefit from subscription to CAS for information of a lighter or more practical nature, such as their customised user profiles, to receive horoscopes and weather forecasts on a daily basis (Fourie, 2003).

3.5.9 Contribution to health education and improvement of health information literacy

Pregnant women need information and health literacy (Aborigo *et al.*, 2014; Wong *et al.*, 2014; Pereboom *et al.*, 2013). CAS can provide information and promote health literacy for pregnant women on the topics necessary for their overall well-being through e-newsletters (e.g. Mamas and Papas newsletters, Baby Center newsletters), electronic TOC (e.g. Midwifery Journal, Women and Birth) and weblogs (e.g. Your pregnancy blogs, Birthingsa blog and The Mother blogs).

CAS can be provided on a once-off and an on-going basis to fulfil the health educational needs of pregnant women (Fong, 2012). Once they have subscribed to CAS and/or set up their interest profiles, they are automatically notified of new information. To some extent, CAS can replace active searching. There is also the possibility that the use of CAS can improve the health information literacy of pregnant women.

3.6 PROFILING OF CURRENT AWARENESS SERVICES FOR PREGNANT WOMEN

Different types of CAS have been recognised (Hughes & Glueckert, 2014; Glusker, 2013; Monie & Clark, 2013; Xu, 2012) in Section 3.5. These types of CAS can be used to make recommendations on meeting with the information needs of pregnant women in general, as noted in Chapter 2. Once data has been collected on the information needs of pregnant women in a specific context, recommendations can be made based on the needs of the women, bearing in mind these types of services and the benefits of CAS, as discussed in Section 3.5. Some examples of CAS that can be recommended to the women who participated in the empirical component will be given in Appendix G.

3.7 CONCLUSION

Promoting the physical, social and emotional well-being of pregnant women is a necessity in order to build up a strong and healthy society (Hameen-Anttila *et al.*, 2015; Das & Sarkar, 2014). Appropriate information provision and especially CAS via the internet and especially via mobile

technology can promote meeting the information needs of pregnant women, can influence the health information seeking of pregnant women and encourage a healthy lifestyle among them (Lau *et al.*, 2014). Healthcare providers can note the importance and value of CAS and can make recommendations according to the needs of pregnant women situated in specific contexts. A prerequisite for such recommendations would be to verify and validate the contents covered by recommended CAS (Gao, Larsson & Luo, 2013). An example of how this can be done is shown in Appendix G. The CAS included in Appendix G are based on findings from the empirical study.

This chapter focused on background information on CAS, types of CAS, information seeking behaviour models that refer to information monitoring, the value of CAS and information monitoring for pregnant women and profiling of CAS for pregnant women based on the literature review.

The next chapter will explain the research methodology for the study.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter covers the empirical component of conducting the study. The purpose of the study was to determine the information behaviour of pregnant women regarding CAS and information monitoring. This chapter highlights the problem statement, research question and sub-questions and research design, including the research approach, research method, study sample, data collection methods and method of data analysis. It also addresses the validity, reliability and adherence to ethical issues of the study.

4.2 PROBLEM STATEMENT, RESEARCH QUESTION AND SUB-QUESTIONS

As noted in Chapter 1, the problem investigated by this study concerned the information behaviour of pregnant women and the way in which CAS can help to meet their information needs:

What are the information needs and information behaviour of pregnant women, with specific reference to needs to monitor new information and the use of current awareness services?

To address the problem, the following research sub-questions had to be answered:

- What has been reported in the subject literature on the information behaviour of pregnant women and related groups?
- What has been reported in the subject literature on the use of information monitoring and CAS with regard to healthcare and everyday life contexts?
- What are the information needs of pregnant women?
- What is the purpose of information seeking by pregnant women?
- What is the importance of information monitoring to pregnant women?
- What problems do pregnant women face in seeking information to keep up with the latest information?
- How can pregnant women use CAS?

4.3 RESEARCH DESIGN

Research entails systematic and scientific methods of collecting, analysing and interpreting data on a particular phenomenon so as to have in-depth understanding of the particular phenomenon (Leedy & Ormrod, 2014: 2). It also refers to the processes of finding answers to research questions through data gathering, analysis and validation of the analysed data to solve research questions (Kumar, 2011; Burns, 1997). Research designs are the overall plans and procedures for solving the research questions on a particular phenomenon (Leedy & Ormrod, 2014: 2-6). According to Creswell (2014) and Denzin and Lincoln (2011), a research design refers to the inquiry strategies for a particular research problem and using the inquiry strategies to solve research problems. The research questions dictate the type of research design useful for solving research problems (Leedy & Ormrod, 2014: 14).

4.4 RESEARCH APPROACHES

There are three main research approaches, namely mixed methods research, qualitative and quantitative research approaches (Creswell, 2014; 3; Leedy & Ormrod, 2013; Creswell & Clark, 2011).

4.4.1 Mixed methods research

Mixed methods research refers to the integration of quantitative and qualitative research methods to answer research problems in one study (Creswell, 2014: 2-3; Pickard, 2013: 9). It refers to a study combining numbers from statistical quantitative analysis and qualitative data collected from words such as expressions of experiences and points of view (Creswell & Clark, 2011; Greene, Caracelli & Graham, 1989). Mixed methods research has metamorphosed over the years and although a number of authors, such as Creswell (2014) and Leedy and Ormrod (2013), have explored the concept and the application of mixed methods research, it is a relatively new research methodology, dating back to the 1980s and early 1990s (Creswell, 2014; Creswell & Tashakkori, 2007).

According to Johnson *et al.* (2007: 123), “mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g. use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration.” Creswell and Tashakkori (2007: 4) defined mixed methods research “as research in which the

investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry.” Mixed methods research reports data collected qualitatively and quantitatively in a single study, incorporates qualitative and quantitative methods into its data analysis and interpretation, discussion and inferences so as to provide much richer understanding of the topic being studied (Pickard, 2013; Case 2012; Creswell & Tashakkori, 2007). Creswell (2014) confirms that mixed methods research harnesses the strengths of both qualitative and quantitative research methods in order to provide a more robust understanding of the research problem than only one research method could yield.

Mixed methods research entails “the use of rigorous qualitative and quantitative methods, integration of quantitative and qualitative data using a specific type of mixed methods design, and interpretation of this integration” (Creswell, 2014: 3).

Studies on mixed methods research are usually small in scope and limited in duration (Creswell & Tashakkori, 2007). The findings from both methods are used to explain the phenomenon being studied (Creswell, 2014; Creswell & Tashakkori, 2007). Mixed methods research applies to descriptive statistics and not just inferential statistics (Creswell, 2014; Leedy & Ormrod, 2013; Gorman & Clayton, 2005).

In mixed methods research, the aspect of integration of the two sets of data, i.e. quantitative and qualitative, cannot be over-emphasised (Creswell, 2014; Creswell & Tashakkori, 2007). Creswell (2014: 3) notes that understanding of mixed methods designs is paramount for the process of data integration in mixed methods research.

There are different mixed methods research designs. Creswell (2014) and Creswell and Clark (2011) discuss these in detail. Only three basic mixed methods designs are noted for this study. They are based on the work of Creswell (2014), but also feature in discussions by Leedy and Ormrod (2013) and Creswell and Plano Clark (2011).

4.4.1.1 A convergent design

A convergent design is a mixed methods design that entails the collection and analysis of both quantitative and qualitative data, and then merging the two data sets analysed for the purpose of result comparison and validation.

4.4.1.2 An explanatory sequential design

An explanatory sequential design refers to a mixed methods design that considers the use of a method to collect quantitative data and then a method to collect qualitative data; the qualitative method is used for providing in-depth understanding and explanation of the findings from the quantitative data.

4.4.1.3 An exploratory sequential design

An exploratory sequential design entails exploring a particular problem that has been studied by using a method collecting qualitative data; then the qualitative findings are used for establishing the quantitative components of the particular study, and the quantitative data that needs to be collected.

For the purpose of this study, explanatory sequential mixed methods design is preferred. Qualitative data is used to provide in-depth understanding about the experiences of the sampled population, as well as the quantitative findings (Creswell, 2014; Leedy & Ormrod, 2014: 276).

Since both qualitative and quantitative methods and data are used in mixed methods research, they are explained in Sections 4.4.2 and 4.4.3. Mixed methods research has an underlying philosophy of post-positivism; it assumes “that any perception of reality cannot be an objective picture but is drawn from empirical observation and existing theory” (Pickard, 2013: 10).

Information seeking behaviour studies of pregnant women in India by Das (2013) have shown that the best research approach to understand the information needs of pregnant women and explore their information behaviour is to use a combination of both qualitative and quantitative research methods. Thus, this study intends to use a quantitative approach and then to use a qualitative approach to explore the information needs and information behaviour of pregnant women (Pickard, 2013: 111). Mixed methods research was preferred because the researcher had the opportunity to collect both qualitative and quantitative data and to compare different perspectives from both qualitative and quantitative data (Creswell, 2014; Creswell & Tashakkori, 2007). Regardless of the advantages of using mixed methods research, Creswell (2014) also notes some challenges. It includes wide-ranging data collection, requires time, energy and familiarisation with both research methods.

4.4.2 Qualitative research approaches

A qualitative research approach refers to constructing stories, texts, video and/or audio data of one or more individuals to depict reality, knowledge, perception, feelings and way of living in a given context (Creswell, 2014: 4). The approach focuses on collecting in-depth and detailed data and is investigative in nature (Leedy & Ormrod, 2010: 85). Qualitative research is a research approach that explores how a group of individuals explains a social problem (Creswell, 2014: 5). It centers on phenomena in their natural settings and examining the phenomena in their complexity. In qualitative research, assumptions are formed based on interpretations of realities and social circumstances in a subjective manner (Leedy & Ormrod, 2014: 141-143; Gorman & Clayton, 2003: 24-28). The underlying philosophy for a qualitative approach is interpretivism; it “assumes the social construction of reality” (Pickard, 2013: 7; Gorman & Clayton, 2005: 24-28).

According to Creswell (2014) and Creswell and Plano Clark (2011: 144) qualitative research methods depend on textural and pictorial data for analysis. Qualitative research presents a research analysis that negates both statistical findings and a quantification approach. It embraces the use of open-ended questions and use of flexible interviews based on pre-determined sets of questions to solve a research question (Pickard, 2013: 267; Strauss & Corbin, 1998: 25).

4.4.3 Quantitative research approaches

A quantitative research approach refers to investigating the characteristics of the observed phenomena as well as the relationship between two or more phenomena (Creswell, 2014: 25-27). Quantitative research does not consider the cause-and-effect relationship of the phenomenon being investigated, but reports a phenomenon as it manifests itself in reality in terms of quantities (Leedy & Ormrod, 2014: 99-100; Neuman, 2011). Therefore, it is considered to be objective and linear in nature while dealing with social facts (Pickard, 2013: 102). Quantitative research measures the variables in numbers and quantifies one or more variables using statistical analysis. The underlying philosophy of quantitative approaches is positivism; it “assumes the objective reality of social facts” (Pickard, 2013: 7; Gorman & Clayton, 2005: 24-28).

4.5 SURVEY RESEARCH AS RESEARCH METHOD

Survey research is a research method that considers studying a representative population sample in order to extract data (Pickard, 2013: 111-113). The data derived from the sampled population is used to generalise the entire population studied. It is often referred to as descriptive surveys.

The process of survey research entails a scenario whereby a researcher develops some pre-determined questions for the sampled population to answer and the responses from the sample population are represented in standard deviation and frequency counts using descriptive statistics. The purpose of survey research is to collect and analyse data gathered from a population sample by asking pre-set questions in order to examine the relationship between two or more variables (Leedy & Ormrod, 2014: 19; Pickard, 2013: 111; Creswell & Clark, 2011: 25). Although surveys are mostly associated with large-scale quantitative studies (Pickard, 2013), their use has also been reported in small studies (Leedy & Ormrod, 2014).

4.6 TARGET GROUP AND SAMPLING

A sample is a small number of a selected or chosen few from a population in a given study (Pickard, 2013: 59). Sampling is the process of choosing a small number from the entire population of a phenomenon being studied (Pickard, 2013: 59). A target group simply means the entire study group studied or examined by a researcher, on which empirical findings are based (Pickard, 2013: 60). The study considered convenience and purposeful sampling techniques. Purposeful sampling was applied because the researcher targeted pregnant women visiting two private medical practices of gynaecologists, and convenience sampling was applied because the participants were selected from practices that were convenient for the researcher. The sampling frame was selected based on the judgment and convenience of the researcher. A convenience sampling method was considered based on the accessibility and availability of the pregnant women and the convenience for the researcher (Pickard, 2013: 63; Gorman & Clayton, 2005). This study took thirty-seven pregnant women into consideration. Creswell and Tashakkori (2007) corroborate that most studies on mixed methods research are small in scope.

4.7 DATA COLLECTION METHODS

In accordance with the decision to use a mixed methods study, it was decided to do data collection by means of a questionnaire and face-to-face interviews.

4.7.1 Questionnaires

A questionnaire is a written list of questions for the purpose of eliciting responses from participants; it is the most common technique for data collection (Athanasou *et al.*, 2012; Gorman & Clayton, 2005). Questionnaires are presented to participants to enable them to make

choices from multiple options or to write down their thoughts and opinions in the case of open questions (Leedy & Ormrod, 2014; Welman, Kruger & Mitchell, 2012).

Advantages include that it is a relatively cheap method, it saves time and energy, it offers the participants privacy and is easy to analyse (Pickard, 2013; Kumar, 2011).

Disadvantages include limited application, a response rate that may be low because the copies of the questionnaire may not be returned and lack of assistance to explain the pre-set questions (Leedy & Ormrod, 2013; Pickard, 2013; Welman, Kruger & Mitchell, 2012).

4.7.2 Interviews

Interviews offer a great deal of information and responses from participants (Leedy & Ormrod, 2013). Research interviews can be classified into structured, semi-structured and unstructured ones (Welman, Kruger & Mitchell, 2012). Interviews allow participants to construct past, present and future events in their own communication tone and make it possible to explore the minds, feelings and thoughts of the participants during the research process (Pickard, 2013: 196).

4.7.2.1 Structured interviews

A structured interview elicits responses from participants in a formal manner, a scenario in which the researcher asks only standard questions from the interview schedule (Leedy & Ormrod, 2013; Pickard, 2013). An interview schedule can be defined as compiled lists of questions in a questionnaire (Pickard, 2013; Welman, Kruger & Mitchell, 2012).

Advantages of structured interviews include that participants can be observed directly, the researcher has some level of control over responses and the risk of poor responses from participants is lower (Pickard, 2013; Welman, Kruger & Mitchell, 2012; Kumar, 2011).

Disadvantages of structured interviews include that the researcher's presence may introduce some elements of bias and that they are expensive and time-consuming (Welman, Kruger & Mitchell, 2012; Kumar, 2011).

4.7.2.2 Unstructured interviews

Unstructured interviews are informal, i.e. researchers do not have a list of pre-set questions even though they know what they have in mind to explore and are used to explore participants' perceptions, knowledge, feelings and thoughts on a particular subject of interest. They provide

in-depth understanding and views from the participant's point of view on a given topic (Pickard, 2013; Welman, Kruger & Mitchell, 2012).

Advantages include that the participants are able and free to express their opinions, perceptions, feelings and thoughts on a given topic, the interview offers in-depth understanding of the topic discussed, it elicits cooperation between participants and the researcher, allows the researcher to maintain some level of control over the line of questioning and allows participants to be observed directly (Pickard, 2013; Welman, Kruger & Mitchell, 2012). It generates high response rates because it creates friendly rapport with participants and permits the researcher to clarify questions that are not well understood (Leedy & Ormrod, 2013).

Disadvantages include that the responses may be biased because of the researcher's presence, it can be time-consuming (Creswell, 2014; Athanasou *et al.*, 2012), the responses may be inaccurate because participants rely on their memories, the participants may choose to be dishonest and relate an incomplete story of events, it requires the researcher's full concentration and does not offer information in natural field settings i.e. it depends entirely on the participants views and perceptions of the question been asked (Leedy & Ormrod, 2013; Kumar, 2011).

4.7.2.3 Semi-structured interviews

Semi-structured interviews are research interviews that are neither structured nor unstructured. They are interviews between the two extremes (Welman, Kruger & Mitchell, 2012). In semi-structured interviews interview guides instead of interview schedules are used. Interview guides are a compilation of topics and different aspects of the topics, although these are not specific (Welman, Kruger & Mitchell, 2012). The compiled list of topics is based on its relevance to the research topic and context (Pickard, 2013).

Advantages includes that it offers a flexible method of collecting responses from participants and provides in-depth information (Welman, Kruger & Mitchell, 2012).

4.7.3 Focus groups

A focus group entails a gathering of a small number of participants for the purpose of sharing and expressing their opinions, experiences, thoughts, feelings and perceptions on a set of open questions (Pickard, 2013; Welman, Kruger & Mitchell, 2012). It also refers to a qualitative method of collecting data through interviews from groups of participants on a particular topic in

one data collection session (Pickard, 2013; Gorman & Clayton, 2005). For a focus group discussion a moderator engages in a face-to-face interview session with participants on a research topic for a particular purpose; the purpose entails having full insight into some aspects of their past, present and future life events (Stewart & Shamdasani, 2015; Puchta & Potter, 2004).

Advantages include that a focus group can be used at all stages of the research process, either at the early or later stage (Pickard, 2013: 244). It exposes the areas of concern of the participants to the researcher and provides avenues for exploring participants' in-depth ideas and knowledge (Pickard, 2013; Welman, Kruger & Mitchell, 2012; Puchta & Potter, 2004). It could promote teleconferencing (Welman, Kruger & Mitchell, 2012; Mann & Stewart, 2000). It is cost-and time-effective because it permits the coming together of different people simultaneously for research purposes (Pickard, 2013; Morgan, Richard & Krueger, 1998).

Disadvantages include that a focus group interview can be difficult to carry out because some participants may disappoint the researcher by not showing up (Mann & Stewart, 2000) and responses from participants may be one-sided because the group may be dominated by eloquent participants overshadowing the shy ones (Puchta & Potter, 2000; Morgan, Richard & Krueger, 1998). It is also difficult to manage because of group dynamics (Stewart & Shamdasani, 2015; Leedy & Ormrod, 2014; Welman, Kruger & Mitchell, 2012).

4.8 VALIDITY AND RELIABILITY

Validity entails the extent of the accuracy and credibility of the research findings to ascertain the reality of a given situation by using certain sets of procedures (Creswell, 2014; Welman, Kruger & Mitchell, 2012; Gibbs, 2007). It also refers to the authenticity of research findings from the viewpoint of the researcher and the participants (Creswell, 2014; Creswell & Miller, 2000). With regard to measurement instruments, validity refers to the degree to which a measurement instrument will quantify or replicate what it is projected to quantify or replicate (Leedy & Ormrod, 2013).

Leedy and Ormrod (2013) and Creswell (2007) noted the importance of external and internal validity in both quantitative and qualitative research, as well as in measurement instruments. Leedy and Ormrod (2013: 89) further identified the following forms of validity with respect to different scenarios:

- Face validity: “the extent to which, on the surface, an instrument looks like it is measuring a particular characteristic.” Face validity is vital for promoting the coming together of a particular group of people in a research study.
- Content validity: “the extent to which a measurement instrument is a representative sample of the content area being measured.”
- Criterion validity: “the extent to which the results of an assessment instrument correlate with another, presumably related measure.”
- Construct validity: “the extent to which an instrument measures a characteristic that cannot be directly observed but is assumed to exist based on patterns in people’s behaviour.”

Reliability entails the ability to generalise the research findings to new natural settings or a sample population (Creswell, 2014; Gibbs, 2007). It refers to the “degree of accuracy or precision in the measurements made by a research instrument” (Kumar, 2011: 181). It also entails the ability of the research instruments to replicate consistent measurements when used for the same purpose, hence the lower the level of error in the instrument, the higher the reliability (Creswell, 2014; Kumar, 2011). Leedy and Ormrod (2013) describe reliability as the extent to which a measurement instrument will produce reliable results as far as the phenomenon being measured remains unchanged.

To ensure validity and reliability of measurement instruments, the researcher undertook the following:

- Pilot-testing of the questions in the questionnaires and interview schedule.
- Thorough scrutiny of the questionnaire and interview schedule by the Department of Information Science Research Ethics Committee University of Pretoria, EBIT Research Ethics Committee, University of Pretoria and Faculty of Health Sciences Research Ethics Committee University of Pretoria for approval.
- Triangulation i.e. comparison of two or more data sources for common themes relevant to the research findings (Leedy & Ormrod, 2013).

4.9 ETHICAL CONSIDERATIONS

Athanasou *et al.* (2012) are of the opinion that any research study using human subjects is required to conform to some ethical guidelines. In addition, the researcher is obligated to make the research process favourable and safe for the participants and to respect their rights (Leedy & Ormrod, 2013; Neuman, 2011). In carrying out this study, the following ethical criteria were considered:

- Ethical clearance to carry out data collection was obtained from the Faculty Committee for Research Ethics and Integrity of the EBIT before any data was collected.
- The participants were briefed on the title and purpose of the study.
- The participants exercised their right to privacy and were permitted to complete the informed consent form before data collection.
- The participants were assured of anonymity and confidentiality.
- The participants were kept safe in a comfortable environment.
- The data collected was kept and filed in a safe place.
- The study conformed to the ethical guidelines of the University of Pretoria.

4.10 DATA ANALYSIS

Thematic analysis was used for analysing the qualitative data collected during interviews. According to the *Sage Encyclopedia of Qualitative Research Method* (2008: 867), “thematic analysis is a data reduction and analysis strategy by which qualitative data are segmented, categorized, summarized, and reconstructed in a way that captures the important concepts within the data set.” Thematic analysis has been used in some studies, e.g. Fugard and Potts (2015), Braun and Clarke (2006) and Fereday and Muir-Cochrane (2006).

4.11 CONCLUSION

This chapter provided a detailed explanation of the research design, research approaches, target group and sampling methods, data collection techniques, validity and reliability and ethical considerations for the study as well as the data analysis. The next chapter will focus on the overall data analysis and interpretation.

CHAPTER 5

DATA ANALYSIS, FINDINGS AND INTERPRETATION

5.1 INTRODUCTION

This chapter focuses on the data analysis and interpretation of the findings from the empirical component of the study on information monitoring and CAS supporting the information behaviour of pregnant women. It reports on the data collection by applying the methodology, methods and instruments for collecting data explained in the previous chapter. Feedback on the questionnaire will be analysed based on the questions asked, then followed by an analysis of the interviews based on the transcribed responses. This chapter covers the quantitative and qualitative data, as well as the triangulation of findings, which forms part of the mixed methods study.

5.2 PROBLEM STATEMENT

The problem for this study concerned the information behaviour of pregnant women and the way in which CAS can help to meet their information needs:

What are the information needs and information behaviour of pregnant women, with specific reference to needs to monitor new information and the use of current awareness services?

To address the problem, the following research sub-questions had to be answered:

- What has been reported in the subject literature on the information behaviour of pregnant women and related groups?
- What has been reported in the subject literature on the use of information monitoring and CAS with regard to healthcare and everyday life contexts?
- What are the information needs of pregnant women?
- What is the purpose of information seeking by pregnant women?
- What is the importance of information monitoring to pregnant women?
- What problems do pregnant women face in seeking information to keep up with the latest information?
- How can pregnant women use CAS?

The data collection therefore specifically focused on personal information related to pregnancy, information needs, preferences for information sources, devices for accessing information, information seeking and factors affecting information seeking, problems encountered when seeking information, need for keeping up to date with new information on pregnancy issues and means to keep up to date with new information.

5.3 RESEARCH PARTICIPATION ACCORDING TO METHOD OF DATA COLLECTION AND DEMOGRAPHIC PROFILES

The study was based on a mixed methods approach, which collected quantitative, but mostly qualitative data. It used convenience and purposive sampling techniques based on the accessibility and availability of the sampled pregnant women, as noted in chapters 1 and 4. The empirical data was collected by using a self-administered questionnaire (*see Appendix A*) distributed to thirty-seven pregnant women during their routine check-ups at two private medical practices of gynaecologists in Pretoria, South Africa. The participants were present at the sites, based on appointments with their gynaecologists. The sites are located in an urban area of South Africa. All participants in the study completed and signed a form of informed consent prior to completion of the questionnaires, as well as for giving permission for the interviews to be recorded.

The researcher visited the two private medical practices of the gynaecologists to administer the questionnaire to interested pregnant women. Invitation handouts were also made available with both gynaecologists' receptionists so as to solicit interested pregnant women to contact the researcher to schedule a meeting for an interview. Data was collected between August and October 2015. Five visits were paid to site A, and three visits were paid to site B to collect data (at site B the gynaecologist had days when many pregnant women had appointments). Not all pregnant women who were approached were willing to participate. Sometimes there was also not enough time between their arrival time and consultation time. The profile of participants is portrayed in Tabled 5.1.

Table 5. 1: Summary of participants according to the method of data collection

	Questionnaire	Interview
Total number of participants	40	11
Number of returns: Spoiled	3	11
Number used	37	
Number of participants whose input could be used	37	11

For the purpose of recording responses and reporting feedback, participants were numbered as P (e.g. P1, P2). The demographic profile of participants is shown in Table 5.2. N is used to indicate the number of participants responding to each question; however, N is not always the same, since participants did not always provide answers to all questions. For some questions N is thus sometimes fewer than 40. This is indicated at each question.

Factual detail on the personal information of participants and information related to their pregnancy are presented in table 5.2. Table 5.3 presents the descriptive statistics on the demographics of the participants.

Table 5. 2: Profile of the participants

Participants	Pregnancy stage	Pregnancies	Marital status	Level of education	Prenatal visits	Reasons for visits
P1	11-20 weeks	4	Married	Grade 12	² -	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
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	More than 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

² Use of a dash (-) indicates no response

Participants	Pregnancy stage	Pregnancies	Marital status	Level of education	Prenatal visits	Reasons for visits
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	More than 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

5.4 FINDINGS AND ANALYSIS FROM QUESTIONNAIRE

This section reports on the findings and analysis of data collected from the questionnaire (*see Appendix A*). Section 5.4.1 starts by reporting the descriptive statistics for the demographic data, followed by the discussion of the findings on personal and demographic detail of participants portrayed in Table 5.2.

The impact of personal information and information related to the pregnancy on information needs, information seeking activities and preferences and the need for information monitoring and CAS, and how findings relate to reports in the literature, will be covered in Section 5.6. Section 5.4 reports only the descriptive statistics and discussion of the findings.

5.4.1. Personal information and information related to pregnancy

Table 5.3 summarises the descriptive statistics for the demographic data of the participants in the study. It includes the stage of pregnancy, number of pregnancies, marital status, highest level of education and number of prenatal visits. As noted in the previous section, N is not always the same for each question. Most of the participants were 31-40 weeks into the pregnancy (17/40, 42.5%), while a small number were more than 40 weeks pregnant (2/40, 5.0%). A high number of the women were first-time pregnant women (12/39, 30.8%), and most of the participants were married (29/40, 72.5%). All the participants had some level of education; the highest scoring level of education among the participants was grade 12 (14/40, 35.0%) followed by diplomas (9/40, 22.5%). All the participants had paid prenatal visits to the gynaecologist; more than six times was ranked the highest frequency (16/38, 42.1%). The reason most frequently mentioned was routine check-ups (40/40, 100%). Other reasons for prenatal visits were indicated in responses to the questionnaire, for example confirmation of pregnancy; this reason did not come up during the interviews.

Table 5. 3: Interpretation of findings on the demographics of the participants

Variables	Responses	%
Stage of pregnancy (n=40)		
1-10 weeks	2	5.0%
11-20 weeks	8	20.0%
21-30 weeks	11	27.5%
31-40 weeks	17	42.5%
More than 40	2	5.0%
Number of pregnancies (n=39)		
First time	12	30.8%
One full term	9	23.1%
Two full terms	8	20.5%
Three full terms	10	25.6%
Marital status (n=40)		
Married	29	72.5%
Single	9	22.5%
Divorced	1	2.5%
Other (boyfriend)	1	2.5%
Level of education (n=40)		
High school, but grade12 not completed	1	2.5%
Grade 12	14	35.0%
Diploma	9	22.5%
Bachelor's degree	7	17.5%
Honours degree	5	12.5%
Master's degree	3	7.5%
Other post-high school qualification	1	2.5%
Approximate number of prenatal visits (n=38)		
One time	2	5.3%
Two times	1	2.6%
Three times	5	13.2%
Four times	7	18.4%
Five times	3	7.9%
Six times	4	10.5%
More than 6 times	16	42.1%
Reasons for prenatal visits (n=40)		
Routine check-up	40	100%
Obstetrics danger signs	1	2.5%

5.4.1.1 Stage of pregnancy

The first question (*see Appendix A*) was asked to determine the stage of pregnancy of the participants (n=40). The majority of the participants were 31-40 weeks into the pregnancy (17/40, 42.5%), followed by participants 21-30 weeks into the pregnancy (11/40, 27.5%), then followed by those 11-20 weeks into the pregnancy (8/40, 20%). Participants who were from one to ten weeks pregnant and more than 40 weeks pregnant were the smallest groups, (2/40, 5.0%) respectively. Although pregnant women have been noted to be active information seekers (Groves *et al.*, 2015; Das & Sarkar, 2014), their information needs and information seeking

activities may differ according to their stage of pregnancy (Asiodu *et al.*, 2015; Hameen-Anttila *et al.*, 2015; Plutzer & Keirse, 2012). One participant received confirmation of being pregnant and completed the questionnaire when she came out of the gynaecologist's office.

5.4.1.2 Number of pregnancies

The second question (*see Appendix A*) sought to determine whether the participants were first-time mothers or had other children or had possibly lost a previous baby (n=39). The participants could choose not to answer this question. Most of the participants were first-time mothers (12/39, 30.8%), followed by participants who had completed three full-term pregnancies (10/39, 25.6%), then one-full term (9/39, 23.1%) and the smallest group of participants had completed two full-term pregnancies (8/39, 20.5%). One of the participants responded that she had been pregnant before, but it was not a full-term pregnancy. During the interviews, it was found that three women were carrying high-risk pregnancies because of their age (this is dealt with in more detail in the discussion on the qualitative data collected during the interviews).

5.4.1.3 Marital status

For question three (*see Appendix A*), on marital status, the participants had the option not to answer or to state other options than those presented in the questionnaire, n=40 (only one of the participants stated another option: boyfriend). A high number of the participants indicated being married (29/40, 72.5%), while a few of the participants indicated being single (9/40, 22.5%). One of the participants (1/40, 2.5%) indicated being divorced and one (1/40, 2.5%) indicated having a boyfriend. None of the participants declined to answer this question.

5.4.1.4 Level of education

The intention of question four (*see Appendix A*) was to determine the level of education of the participants (n=40). With the exception of one participant, all had at least completed high school (i.e. Grade 12). Most of the participants had a grade 12 certificate (14/40, 35.0%) followed by those with a diploma (9/40, 22.5%), bachelor's degree (7/40, 17.5%), honours degree (5/40, 12.5%) and master's degree (3/40, 7.5%). The level of education with the lowest number of responses offered the options 'other post-high school qualification(s)' (1/40, 2.5%) and 'high school, but grade 12 not completed' (1/40, 2.5%). Participants in the study were thus fairly well educated, which means that participants from lower socio-economic groups and with lower qualifications might show different findings.

5.4.1.5 Approximate number of prenatal visits for the current pregnancy

Question five (*see Appendix A*) concerned the number of prenatal visits during the current pregnancy. It was aimed at determining how the participants perceived prenatal care and its benefits during pregnancy (n=38). Of thirty-eight participants, most (16/38, 42.1%) indicated more than six prenatal visits, followed by those who indicated four visits (7/38, 18.4%), then three visits (5/38, 13.2%), six visits (4/38, 10.5%), five visits (3/38, 7.9%), one visit (2/38, 5.3%) and two visits (1/38, 2.6%). It is worth noting that all the participants recognised the benefits of prenatal visits for the overall well-being of their health and the fetus.

5.4.1.6 Reasons for prenatal visits

Question six (*see Appendix A*) sought information on the reasons for prenatal visits. Participants could choose from routine check-up, complications and obstetrics danger signs. They also had the option of specifying other reasons for prenatal visits. This question aimed at identifying the reasons for attending prenatal visits (n=40). All the participants indicated routine check-ups as reason for prenatal visits (40/40, 100%), and one indicated obstetrics danger signs (1/40, 2.5%). None of the participants indicated or specified other options. One indicated confirmation of pregnancy from the gynaecologist. All the participants showed interest in monitoring the well-being of the fetus through routine check-ups.

5.4.2 Information asked or looked for on health topics during the current pregnancy

The topics the participants asked about or looked for during their current pregnancy were a pointer to their pressing information needs on relevant pregnancy-related topics. This was addressed in question seven (*see Appendix A*). The question specifically focused on their health-related information needs during the current pregnancy (n=37). Question seven mentions 15 health topics, and participants had to mark Yes/No. Figure 5.1 depicts their responses.

Health topics on which questions were asked during the current pregnancy, with the highest number of responses, included the well-being of the fetus (32/37, 86.5%), medication (31/37, 83.8%), prenatal care (30/37, 81.1%), rest (26/37, 70.3%), exercise (25/37, 67.6%), labour and methods of delivery (25/37, 67.6%), obstetric danger signs (23/37, 62.2%), diet and supplements (21/37, 56.8%), stress management (21/37, 56.8%), diseases and treatment (20/37, 54.1%) and health policies regarding maternity care (20/37, 54.1%). The health topics indicated least often were support against abuse (3/37, 8.1%), genetic counselling (8/37, 21.6%), support to avoid

unhealthy lifestyle e.g. smoking, alcohol intake (13/37, 35.1%) and health facilities if complications arise (15/37, 40.5%).

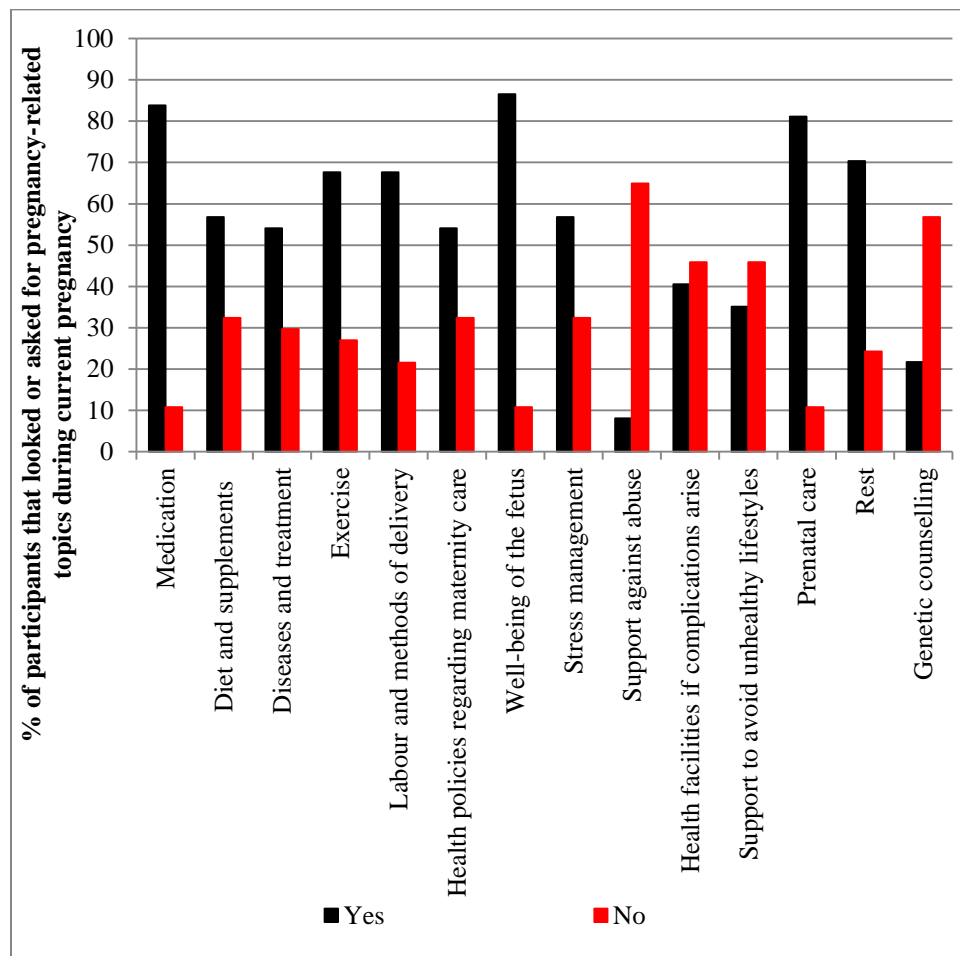


Figure 5. 1: Information asked or looked for on health topics during the current pregnancy

5.4.3 Perceptions of need for information on selected topics during current pregnancy

Question eight (*see Appendix A*) concerns perceptions of need for information on selected topics during pregnancy. Question eight also shows the extent to which information on the health topics are needed. Question eight mentions 15 health topics, and participants had the option of specifying other issues on which they might need information. Only one participant noted an issue, namely: *“the need for a support group for women with disabilities in black/African communities; these women are shunned.”*

The options the participants could choose from are shown in Table 5.4. The participants had to select from a four-point Likert scale (options being strongly agree, agree, disagree and strongly disagree). A higher weighting was thus attached to strongly agree and agree. Thirty-six

participants responded to this question. Table 5.4 summarises the participants' perceptions on the possibility that they might need information on the listed health topics during their current pregnancy (n=36). The well-being of the fetus was ranked as the most needed topic during the current pregnancy, 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.

Other health topics are listed based on the highest ranked after the fourth place: diet and supplements, prenatal care, diseases and treatment, exercise, rest, health policies regarding maternity care, obstetric danger signs and stress management. The least needed health topics during the current pregnancy include support against abuse, genetic counselling and support to avoid unhealthy lifestyles, e.g. smoking, alcohol intake, substance abuse, etc.

Table 5. 4: Perceptions of need for information on selected topics during current pregnancy

Information needs 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	-	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 fetus	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

Note: Weight index is calculated on a four-point scale, thus the weight is assigned as strongly agree= 4; agree=3; disagree=2 and strongly disagree=1. The formula is described as: (Number of votes * Weighting for column 1) + (Number of votes *

³ The sum of the responses did not add up to 37

*Weighting for column 2) + Number of votes * Weighting for Column 3) + (Number of votes * Weighting for column 4)/Total Number of Votes. A higher weighting thus indicates strongly agree and agree.*

5.4.4 Perceptions of need for information on selected topics after current pregnancy

Question nine (*see Appendix A*) focuses on the perceptions of needs for information on selected topics after the current pregnancy and provides insight into pregnant women’s information needs after delivery. Question nine concerns six topics and participants had the option of specifying other issues on which they might need information after delivery. 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 5.5. The participants had the option of selecting from a four-point Likert scale (options being strongly agree, agree, disagree and strongly disagree). A higher weighting was thus attached to strongly agree and agree.

According to Table 5.5, 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.

Table 5. 5: Perceptions of need for information on selected topics after current pregnancy

Possibility that information needs might be experienced after the current pregnancy (N=36)	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	- ⁴	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

Note: Weight index is calculated on a four-point scale, thus the weight is assigned as strongly agree= 4; agree=3; disagree=2 and strongly disagree=1. *The formula is described as: (Number of votes * Weighting for column 1) + (Number of votes * Weighting for column 2) + Number of votes * Weighting for Column 3) + (Number of votes * Weighting for column 4)/Total Number of Votes.*

⁴ The sum of the responses did not add up to 37

5.4.5 Importance of information sources in current pregnancy

Question ten (*see Appendix A*) centers on the importance of information sources during the current pregnancy. It is aimed at determining participants' preferences for information sources during the current pregnancy in order to meet their pressing information needs. Question ten includes nineteen information sources from which the participants could select (n=36). The question had an option of specifying other information sources not mentioned in the questionnaire; however, none of the participants added a new information source. Question ten used a four-point Likert scale (options being not important, slightly important, important and very important). A higher weighting was thus attached to very important and important.

According to Table 5.6, the highest number of 'very important' and preferred information sources among the participants included healthcare provider (23/36, 63.9%), family members (20/36, 55.6%) and internet (15/36, 41.7%). The highest number of 'important' information sources included brochures (19/36, 52.8%), pamphlets (17/36, 47.2%), internet and television programmes (16/36, 44.4%). The highest number of 'slightly important' information sources were blogs (17/36, 47.2%) and text messages (SMS) (15/36, 41.7%). The highest number of 'not important' information source were discussion groups (10/36, 27.8%), text messages, audio-visual materials and social networks (9/36, 25%). Thus, creation of awareness is needed to alert patients (including pregnant women) on the benefits of using mobile devices (especially SMS) for staying abreast with new health information.

Table 5. 6: Preference for information sources among pregnant women

Preference for information sources (N=36)	Not important		Slightly important		Important		Very important	
	No	%	No	%	No	%	No	%
Friends	8	22.2	10	27.8	12	33.3	5	13.9
Family members	3	8.3	2	5.6	14	38.9	20	55.6
Magazines	4	11.3	13	36.1	12	33.3	7	19.4
Search engines	4	11.1	7	19.4	15	41.7	12	33.3
Electronic newsletters	7	19.4	10	27.8	14	38.9	4	11.1
Brochures	5	13.9	7	19.4	19	52.8	5	13.9
Pamphlets	5	13.9	10	27.8	17	47.2	4	11.1
Bulletins	6	16.7	11	30.6	13	36.1	5	13.9
Healthcare providers	2	5.6	1	2.8	10	27.8	23	63.9
Blogs	5	13.9	17	47.2	10	27.8	4	11.1
Text messages (SMS)	9	25	15	41.7	9	25	2	5.6
Books	2	5.6	6	16.7	15	41.7	12	33.3
Internet	2	5.6	5	13.9	16	44.4	15	41.7
E-mails	6	16.7	11	30.6	11	30.6	7	19.4
Social networks	9	25	9	25	11	30.6	6	16.7
Discussion groups (online forum)	10	27.8	9	25	12	33.3	4	11.1
Television programmes	5	13.9	7	19.4	16	44.4	10	27.8
Radio programmes	8	22.2	9	25	12	33.3	6	16.7
Audio-visual materials	9	25	9	25	9	25	7	19.4

Note: No (frequency); % (percentage) N=36 responded to question- but they did not all answer to all options

5.4.6 Devices used for accessing information

Question eleven (*see Appendix A*) aimed at identifying the devices that were useful to the participants for accessing information (n=38). The participants were provided with a list of devices for accessing information, namely mobiles/cell phones/smartphones, tablets, and desktop/laptop, as well as the option of searching by proxy. The participants had the option of specifying other devices they use for accessing information; however none of the participants added to the list of devices.

Most of the participants indicated that they owned mobile or cell phones or smartphones and used these devices for accessing information (34/38, 89.5%). The next group of devices indicated by the participants were desktop/laptop (30/38, 78.9%), followed by tablets (22/38, 57.9%). The least used method was searching by proxy (2/38, 5.3%) (asking other people to search for information on one’s behalf). Mobile/cell phones/smartphones were the devices used most often for accessing information.

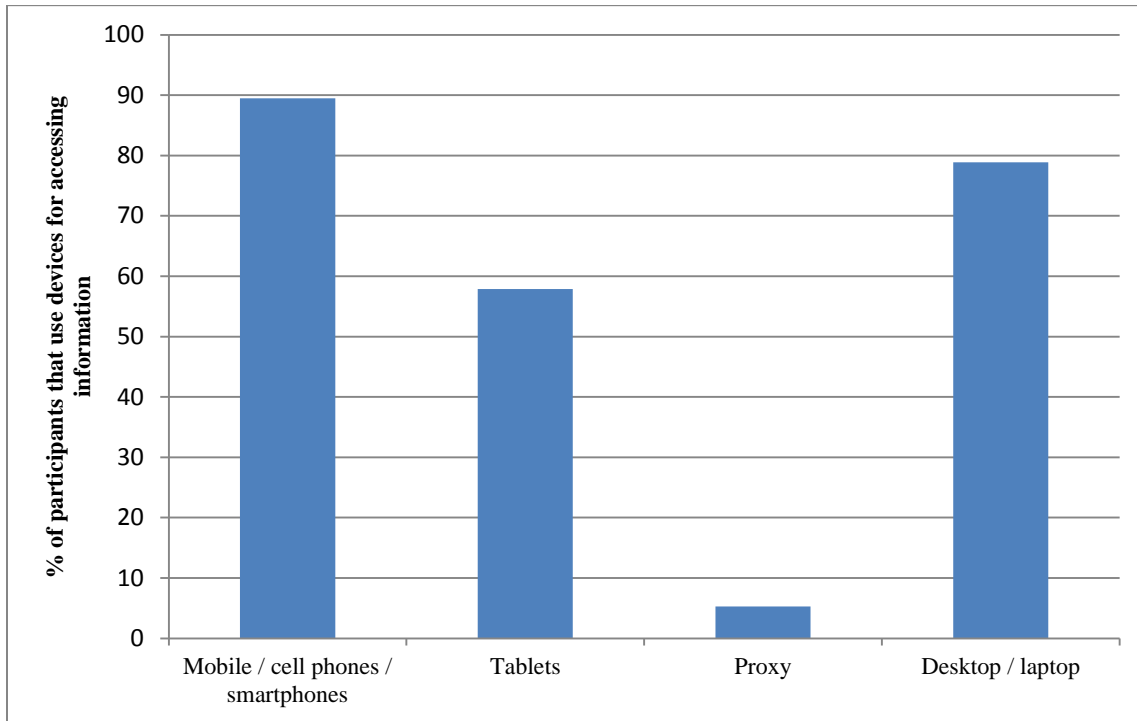


Figure 5. 2: Devices for accessing information

5.4.7 Ways of information seeking

The focus of question twelve (*see Appendix A*) was information seeking and factors affecting information seeking. This was to determine participant’s ways of information seeking. Question twelve was divided into six sub-questions, namely active seeking, active scanning and browsing, non-directed monitoring of information, directed monitoring, by proxy and passive seeking and accidental encountering. All the sub-questions made up twenty-two questions in all (*see Appendix A*). The participants (n=37) had the option to select from a five-point Likert scale (options being already happened, highly likely, likely, unlikely, highly unlikely). The higher weighting was thus attached to already happened and highly likely.

Table 5.7 shows that active seeking (I will ask my healthcare provider(s) for pregnancy-related information) was ranked first. Active scanning and browsing (I will browse the internet for information on pregnancy and related issues) was ranked second. In third place was active seeking (I will search for information by buying pregnancy-related information materials or publications), and in fourth place direct monitoring (I could receive pregnancy-related information by monitoring the internet websites).

The option with the lowest ranking was information seeking by proxy (I will rely on other people to refer me to information or people with information). Some of the participants viewed pregnancy-related information as sensitive information only to be discussed with their healthcare providers (this came out in the interview). The responses to this question are displayed in Table 5.7.

Table 5. 7: Ways of information seeking⁵

Active seeking (turning to sources for a specific purpose) (N=37)	Already happened	Highly likely	Likely	Unlikely	Highly unlikely	Weighted index	Rank
I will ask my healthcare provider(s) for pregnancy-related information	28	4	3	1	1	4.54	1
I will make a list of questions prior to my appointment with my healthcare provider(s)	8	12	12	5	-	3.62	8
I will search for information by buying pregnancy-related information materials or publications	15	8	12	2	-	3.97	3
I will ask friends and family members for pregnancy-related information	13	9	12	3	-	3.86	5
Active scanning and browsing (turning to sources in the hope that you might find something of interest)							
I will browse through bookshelves	6	10	9	11	1 ⁶	3.24	13

⁵ This table will go over more than one page

⁶ The sum of the responses did not add up to 37

in bookshops for pregnancy-related information							
I will browse through bookshelves in libraries for pregnancy-related information	1	7	8	17	4	2.57	18
I will look around in the healthcare provider's consulting rooms for pregnancy-related information	10	10	15	1	1	3.73	6
I will check in maternity centres for pregnancy-related information	7	5	16	8	2	3.27	11
I will look for information on pregnancy by flipping through information materials on pregnancy and related issues	8	9	15	5	-	3.54	10
I will browse the internet for information on pregnancy and related issues	22	6	8	-	1	4.30	2
Non-directed monitoring of information (pursuing no specific goal)							
I might glance through magazines or newspapers for other purposes and then find pregnancy-related information	9	12	12	2	1	3.62	8
I could watch TV or listen to a radio programme, and then come across useful information on pregnancy	9	13	11	2	1	3.65	7
I might find pregnancy-related information in unfamiliar places and circumstances, e.g. seeing a mother pushing a double baby stroller	6	5	17	8	-	3.16	15
Directed monitoring (monitoring sources on an on-going bases for a specific purpose)							

I might subscribe to magazines or relevant publications on pregnancy	4	7	15	7	3	2.97	16
I might find pregnancy-related information through e-mail alerts	5	10	13	5	2	3.14	17
I could receive pregnancy-related information by monitoring the internet websites	14	12	8	2	-	3.95	4
By proxy (getting information through the help of somebody else searching on your behalf)							
I will ask other people to search on my behalf for pregnancy-related information	3	7	4	14	8	2.46	19
I will rely on other people to refer me to information or people with information	2	3	9	9	13	2.16	21
Family members, friends, colleagues and associates scan various pregnancy-related information sources on my behalf and bring information to my attention	3	5	10	6	12	2.41	20
Passive seeking and accidental encountering (getting information without asking)							
I will get information and advice when people see my protruded stomach	8	3	11	9	5	2.92	17
I will pick up pregnancy-related information from other people's discussions, e.g. in health care provider's consulting room, at the hairdresser	7	8	11	6	6	3.19	14
I will pick up pregnancy-related information when friends and family	6	9	11	6	4	3.11	12

bring pregnancy issues to my attention							
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Note: weighted average is calculated on five-point scale: 5= already happened; 4= highly likely; 3= likely; 2= unlikely; 1= highly unlikely. *The formula is described as: (Number of votes * Weighting for column 1) + (Number of votes * Weighting for column 2) + (Number of votes * Weighting for Column 3) + (Number of votes * Weighting for column 4) + (Number of votes* Weighting for column 5)/ Total Number of Votes.*

5.4.8 Problems related to information seeking during current pregnancy

The problems the participants encountered when seeking information indicate the hindrances in meeting their information needs. This was addressed in question thirteen (*see Appendix A*), which was made up of nine sub-questions. The options the participants (n=37) could select from are indicated in Table 5.8. A four-point Likert scale was used for question thirteen (options being strongly agree, agree, disagree and strongly disagree). The higher weighting was thus attached to strongly agree and agree. This section was sub-divided into two, namely additional details of the problem noted and additional details of problem not noted.

According to Table 5.8, the participants indicated that the problem encountered most often when seeking information was that the information and advice given were often unclear and/or contradictory. The second most problematic issue was that they felt embarrassed to ask questions on pregnancy. The third problem often encountered was insufficient discussion time with the healthcare provider(s). The problem encountered least often was feeling too inhibited to seek information because their partner was not supportive, and being forbidden by cultural beliefs to ask pregnancy-related information from people who are not relatives. They also seldom experienced problems to remember the information they received.

Table 5. 8: Problems related to information seeking during current pregnancy

N=37	Strongly agree	Agree	Disagree	Strongly disagree	Weighted index	Rank
I feel embarrassed to ask questions on pregnancy	1	5	19	12	1.86	2
Information and advice given are often unclear and/or contradictory	2	10	19	6	2.22	1
I do not have access to the internet	1	1	12	23	1.46	5
I lack access to information sources other than the internet	-	-	18	19	1.49	4

The attitude and behaviour of healthcare providers are problematic.	-	1	15	21	1.46	5
Insufficient discussion time with healthcare provider(s) is available	1	5	12	19	1.68	3
I am inhibited to seek information because my partner is not supportive	-	1	9	27	1.30	7
My cultural beliefs forbid me to ask pregnancy-related information from people who are not relatives	-	1	9	27	1.30	7
If I get information, I find it difficult to remember	-	1	14	19 ⁷	1.35	6

Note: Weighted average is calculated on four-point scale: strongly agree= 4; agree= 3; disagree= 3; strongly disagree=4. The formula is described as: $(\text{Number of votes} * \text{Weighting for column 1}) + (\text{Number of votes} * \text{Weighting for column 2}) + (\text{Number of votes} * \text{Weighting for Column 3}) + (\text{Number of votes} * \text{Weighting for column 4}) / \text{Total Number of Votes}$.

5.4.8.1 Additional detail on the problems noted

Question fourteen (see Appendix A) provided an option for more detail on any of the problems noted in question thirteen. Only one participant provided the following additional detail on the noted problem:

“I always struggle with BP (blood pressure) during my pregnancies, but healthcare providers do always assist with advice and medication.”

5.4.8.2 Additional detail on problems not covered in 5.4.8.1

Question fifteen (see Appendix A) offered the option of stating other problems that had not been noted in question thirteen. Only one participant stated a problem not included in question thirteen, namely:

“Maternity wear is difficult to find in South Africa.”

⁷ Although N=37, some participants did not respond on all questions. Combining responses for the Likert scale thus do not sum up to 37.

5.4.9 Information seeking for current awareness services

Question sixteen (*see Appendix A*) was aimed at determining whether the participants had searched for pregnancy-related information up to the moment the questionnaire was issued to them. Thirty-five out of the thirty-seven participants indicated that they had searched for pregnancy-related information. Their searches recovered information on development of the fetus, baby development, ability of their baby in general and monitoring baby growth through YouTube videos. The pregnancy-related information searched by the participants includes:

- Sexual well-being: safe sex position during pregnancy.
- Diets and supplements: right amount of caffeinated drinks to be taken during pregnancy, vitamins and other supplements that can or should be taken during pregnancy, and nutrition for pregnant women.
- Prenatal care/general health issues: fetal movements, finding out the gender of the baby, coping with body changes, dealing with first trimester, dealing with swelling of hands and feet during last trimester, coping with heartburn due to growth of the baby, Brixton Hicks contraction, handling baby kicks, coping with fatigue in first trimester, getting good rest, epidural and other birth options, how to calculate expected date of delivery, necessary vaccines, tiredness during pregnancy, symptoms to expect week by week, big tummy at early stage, medication for treating morning sickness, stress management, tiredness during pregnancy, problems with sleep patterns, weight gain during pregnancy and exercise.
- Lifestyle issues: maternity wear and smoking (none of the participants expressed a need for information on drinking during pregnancy).
- Disease/illness conditions related to pregnancy: bladder infection, pains in the hips, miscarriages, pregnancy-induced hypertension causing seizures, blurry vision during pregnancy, diseases dangerous to baby, jaundice, and dealing with constipation.
- Postnatal care: taking care of baby after birth.

Additional detail on problems not covered in the questionnaire

Question seventeen (*see Appendix A*), concerning additional detail on problems not covered in the questionnaire, was not answered by any of the participants.

5.4.10 Interest in keeping up to date with new information

Question eighteen (*see Appendix A*) aimed at identifying the pregnant women’s interest in keeping up to date with new information relevant to their pregnancy (n=37). It is important to stay abreast with new information (Hughes & Glueckert, 2014). Question eighteen had six sub-questions and used a four-point Likert scale (options being not interested at all, may consider keeping up to date, interested, highly interested). A higher weighting was attached to highly interested and interested.

Table 5.9 reports on the issues on which participants want to keep up to date with information and how important they consider 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.

Table 5. 9: Interest of the participants in keeping up to date with new information

N=37	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 ⁸	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

⁸ The sum of the responses did not add up to 37

I need information on non-pregnancy issues such as daily jokes, horoscopes and weather forecasts	19	10	8	-	1.70	6
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Note: Weighted average is calculated on four-point scale: highly interested = 4; interested= 3; may consider keeping up to date= 2; not interested at all=1. *The formula is described as: (Number of votes * Weighting for column 1) + (Number of votes * Weighting for column 2) + Number of votes * Weighting for Column 3) + (Number of votes * Weighting for column 4)/Total Number of Votes.*

5.4.10.1 Other reasons for keeping up to date with new information

Question nineteen (*see Appendix A*) was asked in order to ascertain other reasons why they need to keep up to date with new information not noted in question eighteen. It also exposed the areas of need where information monitoring and CAS can benefit pregnant women. On some issues women expressed an on-going need for information, which turned out not to be the same as what may be categorised as needs for CAS - i.e. a need for the latest information on a topic.

The participants indicated the following:

- On-going need to learn: this applied to the need to keep learning about their pregnancy and to learn from experience, as well as the expression of fear by other pregnant women.
- On-going need to make decisions relevant to their pregnancy during the course of the pregnancy.
- On-going need to avoid anxiety about being in labour.
- Need to stay aware of changes in their environment e.g. healthcare and career environments.
- Need to stay aware of new (and better) methods to deal with their pregnancy, e.g. methods of delivery.
- Need to understand physical and emotional changes as an expecting mother on an ongoing basis throughout pregnancy.
- Need to stay abreast of safety and precursory measures to take relevant to pregnancy and the health of the baby.

5.4.10.2 Explanations for preferring not to keep up to date with new information

Question twenty (*see Appendix A*) dealt with explanations for not keeping up to date with new information.

The participants indicated two main reasons:

- Information overload: too much of the information on the internet can be misleading.
- It was their last pregnancy and/or they were close to the end of their pregnancy and not foreseeing a need to keep up with information during the period immediately after the baby’s birth.

5.4.11 Means to keep up to date with new information

Question twenty-one (*see Appendix A*) covered means to keep up to date with new information. Knowledge of such means can help in identifying suitable services and means that can be recommended to pregnant women. This is paramount for meeting their information needs as well as designing effective systems that can support information retrieval on pregnancy-related issues for them. Question twenty-one had five sub-questions. It used a four-point Likert scale (options being strongly agree, agree, disagree and strongly disagree). Thirty-seven participants answered question twenty-one. Table 5.10 reflects the responses to statements on means to keep informed, such as ‘Healthcare providers provide sufficient resources to keep me up to date with information (i.e. providing information on an on-going basis).’ Healthcare providers were ranked highest as a means to keep up to date with new information. ‘New books, magazines, newsletters, pamphlets and brochures as means to keep me up to date with new information’ were in second place, and then in third place browsing internet websites. Friends and subscribing to a selection of internet resources ranked lowest as means to keep up to date with new information.

Table 5. 10: Means to keep up to date with new information

N=37	Strongly agree	Agree	Disagree	Strongly disagree	Weighted index	Rank
Healthcare providers provide sufficient resources to keep me up to date with information (i.e. providing information on an on-going basis)	9	25	3	-	3.16	1
My circle of friends is sufficient to keep me up to date with new information	2	21	12	2	2.62	5
It is sufficient to browse internet websites to keep up	13	13	10	1	3.03	3

with new information						
Subscribing to a selection of internet resources is sufficient to keep me up to date with new information	9	19	8	1	2.97	4
New books, magazines, newsletters, pamphlets and brochures are useful sources to keep me up to date with new information	9	21	7	-	3.05	2

Note: Weighted average is calculated on a four-point scale: strongly agree= 4; agree= 3; disagree= 3; strongly disagree=4. *The formula is described as: (Number of votes * Weighting for column 1) + (Number of votes * Weighting for column 2) + (Number of votes * Weighting for Column 3) + (Number of votes * Weighting for column 4) + / Total Number of Votes.*

5.4.12 Topics/issues to keep up to date with

Question twenty-two (*see Appendix A*) asked participants to state topics/issues on which they wanted to be updated. The participants indicated the following as topics to be monitored:

- Diseases related to pregnancy.
- Babies' health, e.g. position, development.
- Means for expecting mothers to stay healthy, e.g. knowing when to expect swollen feet, taking safe action (e.g. knowing whether it is safe to bend during pregnancy), maintaining healthy lifestyles, dealing with stress during pregnancy.
- Postnatal care: losing weight after pregnancy, taking care of the baby, sleeping patterns for babies, maternal welfare, immunisation, skin problems, physical exercise, milestones of each month for the baby.
- Prenatal care: blood pressure during and after pregnancies, diet, stem cell information, medication during pregnancy.
- Research findings: new studies on vaccine safety, new studies on alternative medicine and treatments.

Reasons for wanting to be updated on the stated topics/issues

Question twenty-three (*see Appendix A*) enquired about the reasons for wanting to be updated on the topics stated in section 5.4.12 (*see Question twenty-two*). The participant's reasons included the following:

- Ensuring healthy outcomes for both the mother and the baby: treating the baby with important medication (including immunisation), and losing weight gained during pregnancy.
- Overcoming uncertainty regarding pregnancy, e.g. finding/receiving information that can prevent health risks and complications during pregnancy.
- Preparing for potential problems based on problematic past experiences, e.g. sleeping patterns of babies, coping with skin problems (eczema), and pregnancy-induced blood pressure.

5.4.13 Value of questionnaire to raise awareness of needs for information

Question twenty-four (*see Appendix A*) aimed at determining the value of the questionnaire regarding raising awareness of needs for information among the participants. The question allowed for a Yes/No response. All the participants said that they had benefitted from the questionnaire, which raised their awareness of potential needs for information. Their explanations can be categorised as follows:

- (a) Recognition of unexpressed information needs

“I was not aware that I need more information on abuse and counselling.”

“I have never considered need for stress/abuse information as relevant.”

- (b) Learning about useful information sources such as the different sources listed in the questionnaire, e.g. pamphlets, brochures and magazines.
- (c) Becoming aware of issues not directly associated with the state of pregnancy, such as dealing with stress and abuse, getting counselling, emotional support and reassurance.
- (d) Becoming more aware of the need to adopt a new lifestyle after pregnancy.

Importance of the questionnaire regarding the need to keep up to date with new information

Question twenty-five (*see Appendix A*) inquired about whether the questionnaire raised awareness of the need to keep up to date with new information. Most of the participants answered yes (32/37, 86.5%) while a minority answered no (5/37, 13.5%).

The participants gave the following explanations:

- a) Awareness of information sources: becoming aware of sources that can be used to stay abreast such as blogs.

“I was not aware that there are informative blogs about pregnancy.”

- b) Awareness of the need for reassurance: becoming more aware of the value of information and staying abreast with it to ease the process of pregnancy.

“If I am aware about new information the process of pregnancy will go smoothly.”

- c) Awareness of the need to know about pregnancy-related information: to serve as reminders for important information that may have been forgotten.
- d) Stressing the importance of taking care of a human life.

“Sometimes we forget important stuff, so we need information even if it has to be repeated.”

“It is important to keep up to date with these things, it’s a life and I feel that I should know what happens or needs to happen all the time when it comes to children.”

5.5 COMPARISONS OF PROFILE DATA WITH FINDINGS REGARDING INFORMATION NEEDS AND INFORMATION SEEKING

When necessary, findings from the literature will also be noted to put findings from the empirical study in context.

Impact of personal information and information related to pregnancy on information needs, information seeking activities and preferences

This sub-section deal with personal information and information related to pregnancy on information needs, information seeking activities and preferences and the need for information monitoring and CAS noted in the questionnaire (*see Appendix A and section 5.4*) and how the findings relate to reports in the literature.

5.5.1.1 Stage of pregnancy

Identifying the participant's stage of pregnancy (*see analysis of the findings for question in section 5.4.1.1*) is important because pregnant women are active information seekers and thus seek pregnancy-related information at every stage of pregnancy (Groves *et al.*, 2015; Das & Sarkar, 2014). According to the literature, pregnant women's need for information varies, especially with time (Asiodu *et al.*, 2015; Hameen-Anttila *et al.*, 2015; Plutzer & Keirse, 2012).

The findings from this study confirm that pregnant women actively seek pregnancy-related information throughout pregnancy and that their needs vary with time and during different stages of pregnancy (*see section 5.4.1.1*). The noticeable difference among the participants regarding their stages of pregnancy was in the needs of first-time mothers in comparison with those who have had previous pregnancies. Those who had experienced previous pregnancies were interested in keeping up to date with new trends regarding pregnancy, and how age could affect their pregnancy. First-time mothers were interested in knowing everything about pregnancy. The reason why more differences were not noted might possibly be that this study used a small group and a limited demographic profile. A larger study, covering a wider spectrum of demographics, might yield different findings.

5.5.1.2 Number of pregnancies

Pregnant women have needs for information, advice, reassurance and health literacy during their pregnancy (Bantan & Abenhaim, 2015; Aborigo *et al.*, 2014), especially first-time mothers, because they have no prior experience (Fleming, Vandermause & Shaw, 2014). Lee *et al.* (2014) note that women with high-risk pregnancies need information to make informed decisions on their health and the fetus. They consult a wide range of information sources other than received from their healthcare providers.

Findings from this study indicated that most of the participants were first-time mothers (*see analysis of the findings for question in section 5.4.1.2*) with needs for pregnancy-related information. First-time mothers expressed more needs for information than those who had had previous pregnancies. During the interview three of the eleven participants were carrying high-risk pregnancies and they confirmed their use of multiple sources of information however they were not first-time mothers (*see analysis of the findings for question in section 5.6.1c*).

5.5.1.3 Marital status

Supportive or committed spouses could influence the information seeking behaviour of pregnant women positively (Guillory *et al.*, 2014). Most of the participants were married (29/40, 72.5%) (*see analysis of the findings for question in section 5.4.1.3*). Pregnant women with supportive spouses tend to involve their spouses when seeking information to meet their information needs. This could make the process of finding information easier.

Findings confirm that the participants expressed their need to stay abreast with pregnancy-related information (*see analysis of the findings for questions in section 5.4.10 & 5.4.12*). Some of the participants confirmed that their spouses assisted with finding pregnancy-related information.

5.5.1.4 Highest level of education

Hameen-Anttila *et al.* (2015), Das and Sarkar (2014) and Wright, Biya and Chokwe (2014) found differences in the information seeking behaviour of women with higher levels of education compared with those with a low level of education.

Results from the findings of this study showed that all the participants had formal education (*see analysis of the findings for question in section 5.4.1.4*). The nature of the sites where data were collected could have influenced this, because one was in a high-income area where mostly well-educated people reside, and the other was at a private hospital for women. [The researcher did not see a difference between those with higher education and those who had lower education. The only noticeable factor was they were all interested in their safety and the fetus; this might also be because most of the women (twenty-four) had university qualifications while almost all the others (fifteen) had completed high school.]

5.5.1.5 Approximate number of prenatal visits for the current pregnancy

The importance of prenatal visits during pregnancy cannot be over-emphasised. Al-teeq and Al-Rusaies (2015) and Openshaw, Bomela and Pretlove (2011) note the benefits of prenatal visits for reducing pregnancy risks and complications.

All the participants' responses about prenatal visits were positive (*see analysis of the findings for question in section 5.4.1.5*). The participants were positive about prenatal visits evidently from their decisions to attend the visits regularly, and also because they regarded their healthcare provider as their primary source of information. This confirms that the participants were

interested in meeting their unmet information needs concerning pregnancy; CAS could be beneficial in meeting those needs.

5.5.1.6 Perceptions of needs for information on selected topics after current pregnancy

Studies on pregnant women have stressed the importance of both pre and postnatal care (Asiodu *et al.*, 2015; Lau *et al.*, 2014; Openshaw, Bomela & Pretlove, 2011) for pregnant women. Hutti *et al.* (2015) and Waring *et al.* (2014) confirm that pregnant women have needs for information after pregnancy on topics such as taking care of the baby and weight gain.

The findings of this study confirm that the participants have needs for information throughout pregnancy and after pregnancy (*see analysis of the findings for question in section 5.4.4 and 5.4.13*). Information on baby skin care, losing weight, and taking care of the baby are a few of the information needs stated for the period immediately after pregnancy. During the interview, some of the participants emphasised the need to make more information available on dealing with life after pregnancy, especially on self-care and caring for the baby.

5.5.1.7 Importance of information sources in current pregnancy

The literature on pregnant women has noted that they consult arrays of different information sources during pregnancy (Asiodu *et al.*, 2015; Bantan & Abenham, 2015; Das & Sarkar, 2014), especially their healthcare providers. A study on information seeking among pregnant women by Das (2013) found that there is a direct connection between the information needs of pregnant women, information seeking and information sources.

The findings of this study confirm the importance of information sources for pregnant women (*see analysis of the finding for question in section 5.4.5*). All the participants confirmed that they used multiple information sources to seek information during pregnancy. Healthcare providers, family members and the internet were the most important information sources identified (often marked as “very important”).

5.5.1.8 Device used for accessing information

Pregnant women can access and stay abreast with pregnancy-related information by using their mobile devices (Lau *et al.*, 2014; Waring *et al.*, 2014; Dalrymple *et al.*, 2013).

Most of the participants confirmed that they used either mobile or cell phones or smartphones for accessing information (34/38, 89.5%). Some of the information needs identified were

information on the well-being of the fetus, medication, healthcare facilities if complications arise and methods of delivery. This information can easily be accessed through mobile devices, tablets and laptops/desktops, especially if the participants have internet connections and have subscribed to pregnancy CAS.

5.5.1.9 Problems experienced with information seeking during current pregnancy

Studies on information behaviour of pregnant women have identified some problems they encounter when seeking information (Aborigo *et al.*, 2014; Waring *et al.*, 2014; Song *et al.*, 2013). Wennberg *et al.* (2015) and Wennberg *et al.* (2013) found that pregnant women are faced with the problem of unclear information or contradictory recommendations from different information sources. Insufficient discussion time with the healthcare provider is another major problem facing pregnant women (Heaman *et al.*, 2015; McDonald *et al.*, 2014).

Findings from this study confirm that pregnant women face a number of challenges when seeking information (*see analysis of the findings for question in section 5.4.8 and 5.6.4*). The participants confirmed that they faced challenges of insufficient time with their healthcare provider during consultation time, forgetting syndrome, insufficient access to the internet and unclear or contradictory information from the internet and books. CAS can assist with providing new pregnancy-related information that can make up for all the challenges faced by these women.

5.6 FINDINGS AND ANALYSIS OF INTERVIEWS CONDUCTED WITH PREGNANT WOMEN

Interviews were conducted with eleven pregnant women, seven from site A and four from site B. Women at site A were more inclined to participate in interviews, while at site B they were often in a hurry to leave after their consultation with the gynaecologist. There was seldom enough time between their arrival at the medical practices of gynaecologists and their consultation session. Although the researcher was originally hoping to interview twenty pregnant women, interviews with only eleven were possible. The interviews were tape-recorded (voice recorder) with the women's signed consent (*see Appendix D*). Interviews lasted between five and twenty minutes. The interviews that lasted for five minutes were short because the participants were in a hurry to leave. Since these interviews presented valuable information, they are included in the analysis; only two participants were interviewed for five minutes. All interviews were conducted

according to the interview schedule in Appendix B. Focus group interviews were suggested but no one was interested so they did not take place.

The participants who were involved in the interviews were predominantly those who provided consent to participating in the follow-up interviews at the two medical practices of gynaecologists in Pretoria. The responses of the participants participating in the interviews were used for clarifying and interpreting the quantitative findings for better comprehension of the phenomenon (Creswell, 2014; Leedy & Ormrod, 2013) at the medical practices of gynaecologists in Pretoria.

Interviews with the participants gave them the opportunity to share their views, opinions, thoughts and perceptions on the topics being discussed (Leedy & Ormrod, 2013; Pickard, 2013). During the data collection process, the researcher ensured epoché or bracketing (i.e. the elimination of personal bias due to past experiences or perception) (Leedy & Ormrod, 2013: 260) for the purpose of sole-reliance on only participants' responses during the interview. This was important, since the researcher herself was expecting her second baby. Leedy and Ormrod (2013) and Moustakas (1994) advocate the importance of epoché or bracketing during interviewing for reducing researchers' biases and prejudices. Epoché is necessary for ensuring the researcher's neutrality in a study (Leedy & Ormrod, 2013: 267). According to the *Sage Encyclopaedia of Qualitative Research Methods* (2008: 64-65) "bracketing or epoché is a rigorous process that suspends internal and external suppositions, thereby allowing the focusing in on a specific phenomenon to understand or see it as it is." The researcher ensured bracketing or epoché by allowing the research findings to be based on the participants' views and opinions (Given, 2015). The researcher also ensured bracketing by relying only on the responses of the participants and suspending personal opinions or views throughout the duration of the interviews.

The interview schedule consisted of seven main questions, including an open question (*see Appendix B*). The interviews were held at the waiting rooms of the medical practices of gynaecologists and at the coffee shops within the hospitals (depending on the interest of the participants) in order to provide a comfortable setting for the participants. The conversations recorded on the voice recorder were stored in the researcher's password-protected computer in a password-protected folder for confidentiality. For the purpose of anonymity the names of the participants were not included; rather codes were used (Saldana, 2013). For purpose of this

study, the participants were named P1 to P11. The same questions were asked of all the participants for the purpose of consistency. The findings are based on all the information relevant to the questions asked and thematic analysis is used for categorising the responses into themes. The thematic analysis was done by recognising, categorising and reporting themes from the data collected from participants. The questions asked during the interview included the following:

- 1) Discussion of the information needs of women during their current pregnancy
 - a. Experiences of information needs they would like to note from earlier experiences of pregnancy, if applicable
- 2) Discussion of issues on which they would like to monitor new information
 - a. During their pregnancy
 - b. Immediately after the pregnancy
 - c. Issues resulting from their pregnancy
- 3) Discussion of ways of staying abreast with pregnancy-related information
 - a. Ways and means they have used up to the time of the interview
 - b. Opinion on other ways suggested by the researcher
- 4) Barriers encountered during information seeking and staying abreast of new information
- 5) Sources that would be preferred for staying abreast with new pregnancy-related information
- 6) Other issues that may arise from responses to the questionnaire
- 7) Additional information they would like to share related to the focus of the study

5.6.1 Information needs experiences during pregnancy

The researcher ensured that the concept of information needs was briefly explained to the participants when asking this question. All the participants had their own unique experiences with regard to information needs during their current pregnancy. The following themes, which are in line with the questions asked, were noted from the discussions. Thematic analysis was used for the data analysis.

a) Needs arising due to long period of time since previous pregnancy

A noticeable phenomenon among the participants was uncertainty about their pregnancy and high-risk pregnancy which is also in line with findings from literature (Aborigo *et al.*, 2014; Lee

et al., 2014). The participants' statements often included various reasons for a need arising, as in this case:

P1 “... *because I have been out of pregnancy for a while and now pregnant with fourth pregnancy, we thought we were done with giving birth, and I suppose because of the gap which is more than eight years going to nine years already: things have changed and the current pregnancy is a high-risk pregnancy hence I need a lot of information.*”

b) Needs due to the participant's age

Three of the eleven participants were above forty years of age. They expressed concern about how their age could affect the fetus. These women needed reassurance and information that could help with having a healthy baby. P2 did not seem to need information to make decisions, but needed information on how to cope with the possibility of having a baby with some health issues.

P2 “*I have looked for information on Down syndrome because the age factor was bothering me but I was determined to go through with the pregnancy*”. [She is in her early forties.]

c) Needs arising from high-risk pregnancy

Lee *et al.* (2014) confirm that women with high-risk pregnancies use multiple sources of information to cope with the perceived health risks, and they usually perceive the risks differently from the healthcare provider's point of view. High-risk pregnancy is referred to as pregnancy with some health issues that pose a threat to the health of the mother or developing fetus (Lee *et al.*, 2014: 404). Hutti *et al.* (2015) and Lee *et al.* (2014) found that women with high-risk pregnancies experience negative emotions such as fear and anxiety.

P1, P2 and P3 explained their experiences related to their high-risk pregnancies:

P2 “*I need information on Down syndrome, the chances of having Down syndrome and how to detect it while pregnant.*”

Participant P2 noted that she was already of more advanced age [she was in her forties] and she was worried about what to expect and how to cope with the situation if it eventually happened.

P3 *“We found out about a possibility of our baby having Down Syndrome; we were implored to register for necessary tests at the fetus assessment center but we had no prior information about it and how to deal with Down Syndrome.”*

Participant 3 had no background knowledge on what to expect: *“I don’t think I have ever cried the way I cried concerning this baby in my life.”*

d) Needs due to option to participate in decision making or past situation concerning the previous pregnancy

Method of delivery is an important aspect of pregnancy that usually triggers pregnant women’s curiosity about the best option (Karlstrom, Lindgren & Hildingsson, 2013). Farajzadegan, Saeedi and Motamedi (2015) found that pregnant women’s satisfaction after childbirth could greatly influence their next choice of method of delivery.

P3 and P9 expressed their information needs on methods of delivery.

P3 *“I need information on vaginal birth after caesarean section; I need to know what risks might occur during pregnancy and labour, I need assurance on whether I would be able to do it.”*

P9 *“I have tried to search for information on the methods of delivery and until now am still not sure of which one, I want the natural obviously but am aware of the pain.”*

Both participants needed information on methods of delivery and risks associated with different methods of delivery. Pregnant women often also need assurance and reassurance (Al-Ateeq & Al-Rusaies, 2015); P3 e.g. needed reassurance. P3’s information need could only be addressed by her healthcare provider.

e) Needs arising from uncertainty

Studies on pregnant women have associated uncertainty with pregnancy (Aborigo *et al.*, 2014; Lau *et al.*, 2014). Uncertainty was also noted in an earlier section (*see Section 5.6.1a*) regarding pregnancy.

P7 *“I wasn’t sure of which one (medicine) to take regarding my medication.”*

Needs such as this require intervention by the primary healthcare provider or a representative.

f) Needs concerning well-being or health

A number of information needs related to general well-being and health were noted during the interview. Importantly, the well-being, safety and/or health of the fetus were of foremost importance to most of the participants.

P8 explained her experience of tiredness:

P8 *“Currently I just want to find out why I am so tired, I still take my supplements but am always tired.”*

P8 was looking for explanations for her tiredness. Published information can give some pointers and background information on this issue, but an answer will require assessment by her primary healthcare provider (Grimes, Forster & Newton, 2014; Singhal *et al.*, 2014).

g) Needs related to unique situations

P5 expressed her information need on suitable exercises for pregnant women in the gymnasium. She explained that: *“The gym instructor says instead of twenty minutes exercise, do ten minutes because he’s not sure and it wasn’t working for me financially due to the fact that I spend less time there.”*

P5 added a need for information on full body massage:

“I need to know whether there are specialised people who conduct full body massage and spa treatments for pregnant women, but I have not really seen any straight answers on who is qualified to massage pregnant women, I am not sure if there is.”

In the researcher’s opinion, some of the needs mentioned above could be addressed by doing a retrospective type of search (i.e. finding information that is available). Some information needs, especially sensitive needs (specifically in view of the nature of the primary need) can only be satisfied by women’s healthcare providers. Published information can supplement such an answer or can prepare women to understand the explanation better (Altin *et al.*, 2015; Asiodu *et al.*, 2015).

5.6.2 Issues relevant to information monitoring (i.e. needing information on an on-going bases)

As noted earlier, studies on pregnant women have found that they are active seekers of information during pregnancy (Fenwick *et al.*, 2015; Das & Sarkar, 2014; Song *et al.*, 2013). It is important to identify the issues on which they would like to monitor new information. The researcher ensured that a brief explanation of the concept of information monitoring was provided to the participants before asking this question. Active searching and seeking can be once-off, sometimes also referred to as retrospective (i.e. finding information that is available), or it could be on on-going bases - thus monitoring sources for new information for a period of time (Fong, 2012; McKenzie, 2003). For this study, information monitoring was set as the duration of the pregnancy and the period immediately after the delivery of the baby. Plutzer and Keirse (2012) confirm that the information sought by pregnant women changes over a time. It is especially important to note the issues important to their benefit during pregnancy and in the period immediately after the pregnancy, as well as issues resulting from their pregnancy.

5.6.2.1 During pregnancy

Four out of the ten 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. Monitoring activities in the context of pregnancy do not stand on their own; information needs might be linked to changes/developments in the woman's state (i.e. what is happening with the baby).

The health and safety of the baby were identified as the highest priority to the participants, especially to those in their forties [the older women]. Genetic counselling and breastfeeding information were some of the relevant issues noted for monitoring by the participants.

a. Health and safety

The importance of the health and safety of both the mother and fetus cannot be gainsaid (Myer *et al.*, 2015; Das & Sarkar, 2014). The most important pregnancy issue that the participants would like to monitor is the health and safety of their fetus.

P1 *"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."*

b. Genetic counselling

Three participants required genetic information on Down syndrome in particular those carrying high-risk pregnancies. P2 and P3 noted that they would like to monitor genetic information and counselling on an on-going basis.

P2 *“Reading about other pregnant women’s experiences on Down syndrome has been comforting”*. [The researcher noted a need for emotional support, information sharing and reassurance.]

P3 *“We found out of a possibility of our baby having Down syndrome so information on how to deal with Down syndrome if it came (the test) out positive was sought.”*

c. Impact of older age

The age of the mother can affect pregnancy (Das, 2013; Song *et al.*, 2013). Participants P1 and P2 expressed concern about the age factor during pregnancy. P1 and P2 were interested in monitoring information on how age could influence their pregnancy.

P1 *“The safety and health of the baby was sought for because of age implication.”*

P2 *“I had looked for information because the age factor was bothering me.”*

d. Breastfeeding information

Breastfeeding information is very important for pregnant women because breast milk is important for preventing infant morbidity or loss (Tuthill, Chan & Butler, 2015). Adequate information on breastfeeding can promote infant well-being. P6 expressed interest in monitoring information on breastfeeding.

P6 *“I want to know how many times in a day to breastfeed.”*

e. Emotional support

The overall well-being of a mother cannot be over-emphasised during pregnancy for a healthy outcome and emotional well-being. Studies on pregnant women have noted that they experience emotional issues such as depression, anxiety and stress (McLean, 2013). Provision of emotional support (in terms of stress management information) is advantageous for pregnant women.

P9 *“Sometimes I find myself crying.”*

5.6.2.2 *Immediately after pregnancy*

Pregnant women have shown concern about a need for information immediately after pregnancy. Postnatal care thus concerns both the mother and newborn.

a) Taking care of the baby/skin care

The participants noted interest in monitoring information on how to care for the baby, because babies often have eczema, heat rashes and other skin infections (Chang & Nakrani, 2014).

b) Medication for the baby

One of the participants expressed a need for monitoring information on infant medication:

P9 *“In case of a situation whereby the baby gets fever.”*

P9 needed information on the right and appropriate medicine to administer to her baby when the baby was ill.

c) Surgery wound care/body care/self-care

A high number of pregnant women who undergo caesarean sections are concerned about dealing with the surgery wounds and self-care (Hernandez *et al.*, 2016; Farajzadegan, Saeedi & Motamedi, 2015). P7 and P3 expressed interest in monitoring information on caesarean section and self-care:

P7 *“Because am having a caesarean section, I need information on how to avoid allergies from treatment resulting from delivery.”*

P3 *“... having had a caesarean section, the first would be blood clotting and medication to deal with caesarean section.”*

d) Physical exercise/weight loss

Pregnancy causes weight gain in women. They are usually concerned with reducing the added weight after pregnancy (Waring *et al.*, 2014). P7, P3 and P9 confirmed that they would like to monitor information on how to lose weight after pregnancy.

P7 *“I need information on losing weight gain after pregnancy”*

e) Family planning

One of the participants noted that she was interested in monitoring information on family planning:

P9 *“Family planning for the purpose of birth control.”*

f) Information on allergies

Some participants expressed a need for information based on their previous experiences, such as allergy:

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.”*

During a caesarean section, healthcare providers usually administer medication to prevent the patient from feeling pain while they are performing the surgery. The procedures could include a spinal block and epidural (Hernandez *et al.*, 2016; Farajzadegan, Saeedi & Motamedi, 2015).

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.

P1 *“The first and most important will be breastfeeding information because this is one area that I have failed my previous children.”*

5.6.2.3 Issues resulting from the pregnancy

Many of the participants confirmed monitoring information on taking care of their body and baby after delivery. Participant’s views are highlighted below in verbatim quotations.

a) How to maintain healthy blood pressure

Pregnancy-induced hypertension is one of the conditions pregnant women develop during pregnancy (Pereboom *et al.*, 2013). This condition is detrimental to the health of the mother and fetus; however it can be managed with the right medication.

P2 *“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. It is important for healthcare providers to care for their wounds after delivery (Hernandez *et al.*, 2016; Farajzadegan, Saeedi & Motamedi, 2015). P3 noted information monitoring on wound care.

P3 *“How to take care of wound incision correctly.”*

5.6.3 Ways of staying abreast with pregnancy-related information

Searching and seeking for pregnancy-related information is a common phenomenon among pregnant women (Fenwick *et al.*, 2015; Grimes, Forster & Newton, 2014). Information seeking could be once-off (which is based on a need to know, when necessary at a specific point in time) and it could also be on an on-going-basis (where a specific effort is made to stay abreast by subscribing to CAS). Pregnant women usually stay abreast of relevant information by consulting a variety of information sources and channels (Bantan & Abenhaim, 2015; Wright, Biya & Chokwe, 2014)

All the participants had unique ways of staying abreast with pregnancy-related information, including the following:

a) Blogs

Blogs are for sharing experiences and comments on diverse topics being discussed. Blogs are not just for sharing new and the latest information, as one would normally associate with information monitoring, but also for new/on-going reports of experiences. Some participants explained that blogs provided them with a sense of comfort when they read about how others dealt and coped with similar health conditions or similar situations. Five out of ten participants showed interest in blogs.

P1 *“I use blogs because of gaining actual experiences from other people.”*

P2 *“I read experiences shared on blogs during difficult time.”*

b) Online information (internet)

Ten out of the eleven participants used the internet for staying abreast with pregnancy-related information.

P1 *“I read online information by browsing the internet.”*

P3 *“I search the internet for useful information.”*

P10 *“I used internet but consult doctor, family members to confirm the needed information.”*

c) Websites

The most cited website was www.babycenter.com.

d) YouTube videos

Only one participant noted the use of YouTube videos for staying abreast with pregnancy-related information. P1 explained that she watched YouTube videos on how breastfeeding works.

P1 *“I gain actual experiences from watching other people through YouTube videos.”*

e) Magazines

Seven of the eleven participants mentioned that they had read magazines for staying abreast with pregnancy-related information. The magazines cited most often were *Baba & Kleuter* and *Your Pregnancy*.

P7 *“I usually read Baba & Kleuter.”*

P3 *“I use Your Pregnancy.”*

f) Family members

Five of the eleven participants used family members for staying abreast with pregnancy-related information. Family members cited most often included the mother (noted by two participants), spouses (noted by two participants) and siblings in the medical profession (noted by one participant).

P9 *“I have asked my mum and sisters but they suggest the traditional way of delivery.”*

g) Pamphlets

Two of the eleven participants used pregnancy-related pamphlets for staying abreast with information.

P6 *“I read pamphlets displayed at doctor’s office.”*

h) Friends

Some participants explained that they talk to their friends, especially ones with babies or past experience. Six of the eleven participants consulted friends for staying abreast with pregnancy-related information.

P4 *“I speak with friends with toddlers.”*

i) Television programmes

Only one of the participants noted that she watched pregnancy and parenting programmes on television, but none of them stated the title of any of the programmes. [This participant was the youngest of them all, a high-school girl.]

j) Spouses

Only two participants indicated that they consulted their spouses to stay abreast with pregnancy-related information. A woman noted that she browsed the internet regularly but confirmed the reliability of the online information with her spouse.

P1 *“So I rely on the internet for information on safety of the baby because am in my forties and regularly ask my husband on information in this regard.”* [This participant’s spouse is a medical doctor.]

k) App on the phone (Bounty App)

One of the eleven participants used a mobile app, namely Bounty App, for staying abreast with pregnancy-related information.

P7 *“It provides information about the baby on a weekly basis.”*

l) Personal healthcare provider (gynaecologist and midwives)

All the participants mentioned consulting their healthcare providers as the most important way of keeping abreast with pregnancy-related information. One of them stated that she received reassurance and comfort from blogs because her gynaecologist could not meet her emotional needs. Others prefer the healthcare provider.

P8 *“Whatever I read on the internet I still have to confirm with my doctor.”*

P7 *“I don’t go on Google, I rather call my doctor.”*

m) Newsletters

One of the eleven participants used newsletters for staying abreast with pregnancy-related information.

P10 “*I read newsletters from credible sites*”.

This participant did not mention the particular newsletter.

n) E-mails

Only one participant mentioned the use of e-mail for staying abreast with pregnancy-related information.

P10 expressed that she would love to receive e-mail on pregnancy-related information.

o) Books

Two of the eleven participants used books for staying abreast with pregnancy-related information.

P5 and P3 explained that they read pregnancy-related books for staying abreast with pregnancy-related information, but they could not remember the names of the authors or titles of the books they had read.

5.6.4 Barriers encountered during information seeking and staying abreast of new information

Studies on information behaviour of pregnant women have established that in their quest for staying abreast with new information or locating pregnancy-related information, they are faced with a number of barriers (Bantan & Abenhaim, 2015; Fenwick *et al.*, 2015; Das & Sarkar, 2014). The participants highlighted the barriers discussed below that they encountered during information seeking and staying abreast with new information.

a) Experiences with healthcare provider (doctor or gynaecologist)

Studies on pregnant women have reported healthcare providers as their primary source of information (McArdle *et al.*, 2015; Aborigo *et al.*, 2014; Grimes, Forster & Newton, 2014). Healthcare providers have a very important role to play in keeping patients, including pregnant women, abreast with new and relevant health information. The experiences of P1 and P2 with their healthcare providers are summarised below.

P1 *“My experience with my healthcare provider was maybe she was too confident or was not in tune with what my needs are. I highlighted it to her on the age factor you hear all kinds of things with regards to having babies late in life. I needed reassurance and new information on new trends about having babies late in life; that I couldn’t get out of her.”*

P2 *“Doctors don’t want to be promising and comforting; they tell the facts to avoid law issue if something goes wrong.”*

b) Insufficient time with healthcare provider

Some of the participants stated that the consultation time with their healthcare provider was insufficient for meeting their information needs. P1 and P3’s views are summarised below.

P3 *“I think you can’t ever have enough time with doctors because each time after returning from her, I find myself surfing the internet, asking or phoning people for more information on the issue.”*

P1 *“I don’t know if time limitation was the problem.”*

c) Perception of insufficient information on some topics on the internet

The availability and accessibility of pregnancy-related information is essential for assisting pregnant women in making informed decisions regarding their health. One of the participants noted insufficient information on some topics on the internet:

P1 *“I am not sure if the need has been met yet, because it’s a high-risk pregnancy and it’s my fourth caesarean section and not a lot of people out there has been through that. Even on the internet it is really difficult to get the information, so I have been relying on what I can pick from here and there I still have the gap in knowledge.”*

P1 *“Insufficient information on how to breastfeed; am not sure if I will get it right this time because I have failed my previous children with breastfeeding.”* [Perhaps she has some other personal issues that are hindering the process.]

d) Contradictory information and credibility of information on the internet

Seven of the eleven participants expressed their concerns and experiences with online information as they encountered contradictory and/or unclear information on the internet. Some explained that they would rather not read anything on Google or if they did, they confirmed the

information with their healthcare providers. Studies by Wennberg *et al.* (2015) and Wennberg *et al.* (2013) confirm this.

P2 *“This days you don’t know which is which; there is also slight variations in information on the internet.”*

P4 *“Contradictory information on different online sites.”*

P5 *“Unclear information on the internet; the information is indeed not the same and as a mother it keeps you paranoid.”*

P7 *“Contradictory information on pregnancy; I don’t go on Google, I rather call my doctor.”*

P9 *“Reliability of information on the internet; I don’t really trust what is on the internet. When I have questions I usually find experienced mothers to ask for needed information or to confirm what I have read.”*

P10 *“One site says it is good, the other says it is bad so you don’t really know what to rely on.”*

P11 *“The information on the internet is sometimes contradictory, it’s better to stick with the doctor and the books he gives.”*

e) Contradictory information in books

Contradictory information applies not only to the internet, but also to other sources or channels of information, including books. One of the participants mentioned that she searched for information on the right diets to be taken during pregnancy from a book, but another book contradicted the first one.

P6 *“I read a book on what to eat and read another book; they discuss the opposite of what I read in the previous book.”*

f) Insufficient access to the internet

Two of the eleven had the problem of insufficient access to the internet.

P11 *“I don’t have a lot of access to the internet.”*

One participant explained that she had sufficient access to the internet, especially at her place of work. The other eight did not emphasise whether it was an issue.

g) Contradictory advice from siblings

Only one participant said that she received contradictory advice from her sister.

P9 *“My sister says I cannot take cold drinks, and now I asked the doctor and the doctor says it is fine as long as it is in moderation, she’s been depriving me of cold drinks for long.”*

h) Forgetting syndrome

Only one participant stated that she forgot information easily.

P2 *“Sometimes I see myself not asking information during prenatal appointments and remembering after leaving.”*

Forgetting information or other issues during pregnancy is a common phenomenon (Farajzadegan, Saeedi & Motamedi, 2015; Aborigo *et al.*, 2014).

[Forgetting easily during pregnancy might be a natural occurrence.]

5.6.5 Sources preferred for staying abreast with new pregnancy-related information

Studies on pregnant women have noted that they use different arrays of information sources when they seek pregnancy-related information (Grimes, Forster & Newton, 2014; Lau *et al.*, 2014; Tripp *et al.*, 2014). McArdle *et al.* (2015) and Grimes, Forster and Newton (2014) found that pregnant women preferred to source pregnancy-related information from their healthcare providers (especially midwives), family members (especially their mothers), internet and friends. The sources noted here are the participants’ preferred information sources. The list below is not in order of preference.

a) Websites

Websites are important information sources for pregnant women (McArdle *et al.*, 2015; Waring *et al.*, 2014). Although the credibility of the contents published on some websites is suspect, a few have been noted to be helpful to pregnant women. The participants referred especially to the Baby center website (www.babycenter.com). The participants’ preference was influenced by positive past experiences and advice from their healthcare providers.

P1 *“I have also used it for my previous pregnancies although some information are relevant while half of it is irrelevant but they help me to know and keep abreast with recent information especially babycenter.com.”*

b) Blogs

The participants explained that pregnancy-related blogs are useful sources of information, as they provide an avenue for sharing pressing needs. They expected to receive comments and answers from experienced mothers on how to deal or cope with situations based on their past experience. Some of the participants were able to receive emotional support and a sense of security from other mothers' experiences on blogs.

P1 *"I read a lot of information and experiences from blogs. It helps me know that someone has gone through that experience before, it's not unique to me."*

P10 *"Sharing of information: This mother writes what happened to a baby; the other writes how she handled the situation."*

P4 *"The one blog that I think it's reliable is baby center."*

c) Magazines

A noticeable point from the responses of the participants was that they preferred easy-to-read materials such as magazines. The participants referred to *Your Pregnancy* and *Baba & Kleuter* magazines.

P2 *"I prefer easy to read stuff and shorter; unlike journals, I prefer magazines."*

P4 *"I use Your Pregnancy magazine I think most of the information I got and feel like its reliable was from magazine and blog."*

P10 *"I like Your Pregnancy magazine."*

d) Healthcare providers

The participants recognised their healthcare providers as the most important information source. Healthcare providers are important for keeping women abreast with pregnancy-related information. Previous studies on pregnant women have noted the important role of healthcare providers in reducing maternal and infant mortality (Hameen-Anttila *et al.*, 2015; Grimes, Forster & Newton, 2014).

P8 *"I have full access to the doctor, I could call him when I need anything. Queries can also be directed on phone to the doctor's secretary and forwarded to the doctor."*

P7 *“I don’t go on Google, I rather call my doctor.”*

Although immediate accessibility of an information source is important, it appears as if confidence in the source is more important; for example, asking the healthcare provider rather than searching on Google.

e) Friends

Some of the participants preferred consulting their friends with similar or past pregnancy experience for staying abreast with pregnancy-related information.

P4 *“I speak with friends with toddlers who have given birth not so long [ago].”*

f) Teachers

One of the participants was a high-school student. She identified her teachers as a source of staying abreast with pregnancy-related information.

P5 *“At school we do that and my teachers.”* [She pointed out her teachers because she was a high-school student.]

g) Books

Two of the eleven participants used pregnancy-related books for staying abreast with pregnancy-related information, although they could not remember the titles of the books.

P5 *“I read books but can’t really remember the name.”*

h) Parents and family members

About five of the eleven participants preferred consulting their family members for staying abreast with pregnancy-related information. They stated that they trusted the information provided by their family members, especially those with past experience, more than online information.

P10 *“... because I don’t really trust everything I read on the internet, I rely on the doctor and family members.”*

P9 *“I have asked my mum and sisters but they suggest the traditional method of delivery.”*

i) Internet

Studies on pregnant women have stressed the significance of the internet in keeping pregnant women informed and helping them to make health-related decisions (McArdle *et al.*, 2015; Waring *et al.*, 2014; Huberty *et al.*, 2013). All the participants used the internet for staying abreast with pregnancy-related information. Three of them noted that they confirmed the authenticity of the information with their healthcare providers.

P10 *“I used the internet but consult doctor, family members to confirm the needed information.”*

P2 *“I use Google search.”*

P4 *“The doctor covered the basics; I still have to search the internet.”*

j) Newsletters and e-mail

Only two participants used newsletters and e-mail for staying abreast with pregnancy-related information. They also expressed interest in receiving pregnancy-based newsletters and e-mail on an on-going basis.

P10 *“I love receiving e-newsletters, e-mails and blogs from credible sites.”*

5.6.6 Other issues mentioned by the participants

The participants identified the following issues:

- The importance of psychological issues in addition to physical well-being

The overall well-being of pregnant women is very important; more attention ought to be paid to their mental and social health rather than only the physical aspects (McLean, 2013). P10 and P11 stated the importance of dealing with the psychological effect of pregnancy positively.

P10 *“Pregnancy is not illness; it is in the mind. The more positive you are about it, the more positive your experience will be.”*

P11 *“Keep being busy and healthy.”*

- More focus on the period after pregnancy

More information focusing on the post-pregnancy period should be made available and accessible, especially on coping: personal coping and self-care and care of the baby. One of the participants highlighted that more information on coping with after-pregnancy issues such as

postnatal depression, losing weight, breastfeeding, bonding with the newborn etc. should be made available to cope with life after pregnancy. Postnatal care is as important as prenatal care.

P9 *“More information should be made available for women to deal with life after pregnancy. They focus more on the pregnancy stage and not after, also how to get back into shape after pregnancy.”*

- Need to address skills in the assessment of the credibility of information

Seven participants showed concern about the reliability of pregnancy-related online information and advice.

P8 *“Do not read everything on the internet or believe everything on the internet.”*

- Preparation for prenatal visits

One of the participants emphasised the significance of making notes before consultations with healthcare providers. She was of the opinion that rather than experiencing the pain of forgetting pressing information needs, it was better to make notes. Mobile devices could help with jotting down relevant information and setting up a reminder on the calendar.

P4 believed in seeking a second opinion, although sometimes this might add to confusion.

P4 *“I think it is always important to list down your questions, to get as much information as possible during prenatal visits. Always seek for second opinion because a lady told me to take vitamins (supplements with folic acid), but my doctor has not told me to do so; because a child has a disease due to the mother not taking adequate supplements while pregnant.”*

5.7 CONCLUSION

This chapter focused on the data analysis of both the quantitative and qualitative data. Data interpretation for both the quantitative and qualitative data was also done in this chapter. The next chapter will focus on the triangulation of the data and the suitability of the McKenzie model for meeting the needs of pregnant women. To limit the length of the current chapter, triangulation of findings will be covered in the next chapter.

CHAPTER 6

FRAMEWORK FOR MEETING THE INFORMATION NEEDS OF PREGNANT WOMEN FOR INFORMATION MONITORING

6.1 INTRODUCTION

This chapter starts with a brief triangulation of the findings from the literature review (Chapters 2 and 3) and the empirical findings (presented in Chapter 5). It then continues with comments on the suitability of the McKenzie two-dimensional model of information practices in ELIS to support the information behaviour of pregnant women in staying abreast of pregnancy-related information. It is explained why and how this model has been adapted slightly. Two additional models, focusing on different facets that stood out from the findings, are also presented. In conclusion, a workable strategy for the use of information monitoring and CAS for meeting the information needs of pregnant women is suggested.

6.2 TRIANGULATION OF DATA

Triangulation concerns the ability to use different research methods to test or validate a research study (Given, 2008) and to draw on the findings from data collected through different methods. Findings from this study confirm much of what has been noted in the literature analysis (Chapters 2 and 3). Literature on pregnant women has, for example, noted that they tend to be active seekers of information. They seek information on how to ensure their safety and the safety of the fetus, and on how to eliminate pregnancy complications and risks (Fenwick *et al.*, 2015; Aborigo *et al.*, 2014; Huberty *et al.*, 2013). These reasons for seeking information were confirmed during the individual interviews and from the questionnaire responses.

Both the literature analysis and the empirical findings confirmed that pregnant women often face problems with unmet information needs. Information needs may remain unmet because they do not express these needs (i.e. unexpressed information needs) or because they do not think of their fears and uncertainties in terms of needs for information (i.e. dormant information needs). From the empirical data a number of situations were noted where the women acknowledged that there were things they wanted to know, but without following up by seeking information. They did not make a conscious effort to meet their information needs; they did not act on their needs. It might

be that they were unaware of the fact that their admitted lack of knowledge implied a need for information. Some of their concerns also pointed to a need for contextualised advice (i.e. advice on their individual situations) rather than mere information. Often their information needs, as noted in the interviews, went beyond information provision to a need for contextualised answers and advice tailored to their unique needs. This was also noted in the literature review.

One reason for anxiety and wanting to know more that was mentioned in an interview, but was not noted in the literature, was that healthcare providers tended to be cautious when discussing a pregnancy; patients might easily sue doctors if their over-positive reassurance does prove misplaced.

Similar to the findings reported in the subject literature, the empirical findings confirmed that healthcare providers, especially doctors, were regarded as the most authoritative and preferred sources of information for pregnant women (Aborigo *et al.*, 2014; Grimes, Forster & Newton, 2014; Huberty *et al.*, 2013). Apart from healthcare providers, the internet and family members are important information sources for keeping pregnant women abreast with pregnancy-related information (McArdle *et al.*, 2015; Das & Sarkar, 2014; Grimes, Forster & Newton, 2014). The study participants confirmed that they sourced information from their healthcare providers, family members and friends with toddlers.

Findings from the empirical study confirmed findings from the literature analysis on factors that influence the information seeking of pregnant women. These include level of education and health literacy (Wright, Biya, & Chokwe, 2014; Das, 2013), age of the mother (Hsieh & Brennan, 2005) and supportive spouses (Guillory *et al.*, 2014). The literature also noted income level (Hameen-Anttila *et al.*, 2015; Kumar, Hoovayya & Ahmed, 2014; Song *et al.*, 2013) as a factor that influences the information seeking of pregnant women; this was, however, not included in the study.

According to the positioning theory accepted by McKenzie, positions in clinical context affect the information seeking and information exchange between healthcare providers and pregnant women (McKenzie, 2004; 2003). She provided insights on how pregnant woman or midwife positioning affected information giving in a social context in order to provide more insight into ELIS. According to her, “an act of positioning situates both the speaker and the person spoken to.” Positioning can be viewed as cognitive or mental space a person chooses in order to gain full

or richer information from another person during a discussion. It could also be seen as where a person places herself mentally in the course of a discussion so as to have a better view of what is being discussed. Her participants “frequently positioned themselves in the course of their prenatal visits” (McKenzie, 2004: 688). These acts influenced the information needs that were met by the healthcare provider and what the healthcare provider (in this case midwives) considered appropriate information to share or provide.

It was found during the interviews for this study that the positions of the pregnant women (i.e. interactional practices when discussing about their pregnancy) influenced their information seeking in terms of the information needs being met by their healthcare provider. Exchange of information with their gynaecologist or the gynaecologist’s receptionist as one-to-one communication played an important role for many of the women in satisfying their needs for contextualised information. Following McKenzie’s positioning theory, it is confirmed that “interpersonal interactions are an important site for the study of information needs, which are in fact negotiated through the very act of chatting” (McKenzie, 2004: 692).

Apart from being actively involved in seeking information, pregnant women encounter information passively and serendipitously (Yeoman, 2010; McKenzie, 2004, 2003a). The empirical study confirmed this. Some participants explained that when people see their stomachs, they share information without being asked.

Pregnant women are faced with many challenges when seeking information to meet their needs. These include the reliability of online information (Wennberg *et al.*, 2015; Wennberg *et al.*, 2013), and cultural practices (Das & Sarkar, 2014; Das, 2013). The study participants confirmed that they experienced problems with unclear and contradictory recommendations from sources on the internet. None of the participants noted that she faced any challenge from the cultural practices point of view.

Participants showed interest in information monitoring and CAS that could help them to monitor the safety and health of the fetus, as well as some other issues, such as the impact of older age on pregnancy, genetic counselling and breastfeeding information. They wanted to monitor information on an on-going basis for the duration of their pregnancies and also in the period immediately following the pregnancy. With regard to the latter, dealing with life after pregnancy was important. Family planning, taking care of the baby and their own weight loss were

important in the findings of this study, while the subject literature also noted postnatal depression, employment opportunities and access to government infrastructure (Waring *et al.*, 2014; McLean, 2013; Song *et al.*, 2013).

The literature confirmed the importance of health information provision to pregnant women in reducing maternal and infant death rates in Africa (Aborigo *et al.*, 2014; Wright, Biya, & Chokwe, 2014; Pereboom *et al.*, 2013). Although this did not emerge quite as strongly among the participants in this study, the importance of information provision was frequently confirmed. Mobile technology has been noted to have the capacity to promote information monitoring among pregnant women (Lau *et al.*, 2014; Darlymple *et al.*, 2013). Thirty-four of thirty-eight participants indicated that they used mobile or cell phones or smartphones for accessing information. Based on the study findings, mobile technology is a viable and acceptable channel of providing health information to pregnant women.

6.3 SUITABILITY OF THE MCKENZIE MODEL FOR MEETING THE NEEDS OF PREGNANT WOMEN

The McKenzie (2003) model was adopted as framework for this study on the information seeking of pregnant women as part of their information practices in everyday life. Apart from focusing on everyday life, the model was considered flexible (the researcher could add additional modes of information seeking). The model could accommodate information seeking for both current and future needs concerning pregnancy (McKenzie, 2004, 2003, 2002). More detail on the selection of the McKenzie model is provided in section 6.4.

Before using the model to direct data collection, two additional modes of information seeking (i.e. directed monitoring and passive seeking and accidental encountering) were added to the four modes of information practices in the McKenzie model, namely active seeking, active scanning, non-directed monitoring and by proxy.

Contextualising the McKenzie model as adapted for this study

The adapted McKenzie model directing the planning stage of the reported study is portrayed in Figure 2.1 in Chapter 2; two modes of information seeking were added to the McKenzie model. Findings showed that all six modes applied to the women participating in the study. Participants reported seeking information at various intervals of their pregnancy. Women who had already

given birth after earlier pregnancies also noted that they sought information in the period immediately after giving birth. Information seeking was not a once-off event; it was repeated.

The modes of information seeking as revealed in the findings reported in Chapter 5 are portrayed in Figure 6.1. Each of the modes will be briefly explained in the following sub-sections.

6.3.1.1 Active seeking

Similar to McKenzie's work, it was confirmed that participants were actively seeking information for a specific purpose and information need. They used mobile apps (e.g. bounty app), websites (e.g. Baby center), electronic and printed information sources, search engines (e.g. Google) and asked questions from healthcare providers. Some came for prenatal visits prepared with a list of questions.

6.3.1.2 Active scanning

Active scanning refers to seeking information with a purpose in mind by looking out for information in likely places, such as browsing bookshelves in libraries or bookshops for pregnancy-related information, looking around in healthcare providers' consulting rooms and flipping through information materials on pregnancy-related issues. This can be compared to what is often referred to as browsing, i.e. seeking information by not typing a search strategy or asking questions, but by looking in a likely place and recognising relevant information. Examples of active scanning were also noted in the empirical component.

6.3.1.3 Directed monitoring

Directed monitoring refers to looking for specific information on something on an on-going basis, for example, frequently visiting a website or subscribing to sources such as newsletters. This mode was not included in McKenzie's model. It is not just a once-off search for a specific issue using specific search terms or a question, such as for active scanning. Participants confirmed that they monitored internet websites, YouTube videos and bounty app searching for pregnancy-related information. Sometimes they received e-mail alerts.

6.3.1.4 Non-directed monitoring of information

Non-directed information monitoring refers to looking for information related to pregnancy issues, on an on-going basis, but not with something specific in mind. It also involves serendipitously encountering information in unlikely places (e.g. glancing through some

information materials for other purposes, then finding information relevant to pregnancy, watching a television programme, and then getting important pregnancy-related information).

The women participating in McKenzie's study also engaged in non-directed monitoring of information. They sometimes bumped into useful information in unlikely locations, for example, seeing a father pushing a baby pram and receiving useful information on pregnancy.

6.3.1.5 By proxy

Information seeking by proxy refers to somebody else seeking information on behalf of the person who needs the information. Similar to what was found in McKenzie's work (McKenzie, 2003), some study participants confirmed that they sometimes asked other people to search on their behalf for useful information, or to refer them to useful sources or channels of information. Some relied on family members and close associates for information sources.

6.3.1.6 Passive seeking and accidental encountering

One of the modes of information seeking added by the researcher is passive information seeking and accidental encountering. Passive information seeking refers to receiving information without asking for it, as well as being exposed to information without making an active effort, such as for active information seeking or directed monitoring (Kratzke, Amatya & Vilchis, 2014; Case, 2012). Information encountering refers to accidentally bumping into useful information without making any conscious effort or unintentionally encountering information (Basic & Erdelez, 2014). Participants confirmed that they received information and advice when people saw their protruded stomachs. Some of them picked up useful pregnancy-related information by overhearing other people's conversation, e.g. in consulting rooms.

Table 6. 1: Contextualising the McKenzie model

Individual-in-context (recognition of information needs)

Modes (activities undertaken when searching for information)	Description of modes	Examples from the study findings
Active seeking	Actively seeking information, advice, support from healthcare providers during prenatal visits to gynaecologists; searching for health topics from books and magazines such as <i>Your Pregnancy</i> ; searching for health information on the internet	Consciously making a list of questions to ask healthcare providers Active involvement with pregnancy-related online discussion groups, e.g. consciously reading other pregnant women's comments and experiences on blogs, online discussion groups
Active scanning	Browsing through health magazines or pamphlets in the healthcare providers' consulting rooms; browsing pregnancy-related websites; browsing in a bookstore for health-related materials	Being attentive to other pregnant women's discussions at the healthcare provider's consulting rooms Being attentive to family members with experience of pregnancy for second opinion on pregnancy issues
Non-directed monitoring	Finding pregnancy-related information while scanning magazines or newspapers for other purposes, for other reasons Finding pregnancy-related information in unlikely places and circumstances, e.g. when sitting in traffic	Finding information through seeing a diseased child (disease that could have been prevented with right medication, such as iron supplements) Finding pregnancy-related information by overhearing other people's conversation in an unfamiliar place, e.g. at an informal gathering
Directed monitoring ⁹	Subscribing to magazines or relevant publications on pregnancy Receiving pregnancy-related information by monitoring internet websites, e.g. Baby Center	Creating alerts on health topics on websites, e.g. alerts on Down syndrome Watching online information sources such as YouTube videos Using mobile app such as Bounty app for staying abreast with weekly fetal development
By proxy	Asking other people to search for information Relying on other people for information referral	Depending on others to be updated with information either through speaking in person or sending information electronically
Passive seeking and accidental encountering	Getting information or advice without making any effort or asking	Getting information when a protruded stomach is seen Picking up information from other people's discussions

⁹ Directed monitoring is the main focus of this study.

What McKenzie referred to as information practices are similar to activities that Case (2012, 2006), and Wilson (1999) and others referred to when first defining the concept of information behaviour. For the purpose of this study information behaviour will replace information practices

6.4 PROPOSAL OF ADDITIONAL MODELS THAT CAN PORTRAY FINDINGS FROM THE STUDY

A wide spectrum of information behaviour models is reported in the subject literature (Case & Given, 2016; Ford, 2015). An adapted version of the McKenzie two-dimensional model of information practices in everyday life seeking guided the data collection for this study. Models used for depicting information behaviour studies could be predicting models, e.g. Wilson's model of information behaviour (Wilson, 1999: 251). Some are process models, e.g. Kuhlthau's model of the information search process (Kuhlthau, 1993: 343). There are also others that focus only on information seeking as one of many information behaviour activities e.g. Ellis (1993). The information behaviour of pregnant women has many nuances (*See Chapter 5, and the triangulation of findings*).

In this section, two graphical presentations are presented to portray various facets of the findings, in addition to the model portrayed in Table 6.1. Figure 6.1 portrays the key activities of information behaviour that stood out from the findings of this study, reporting the recognition of information needs, information seeking, receipt of information, information retrieval using various devices and information use. It portrays the most important information activities, but is not intended as comprehensive.

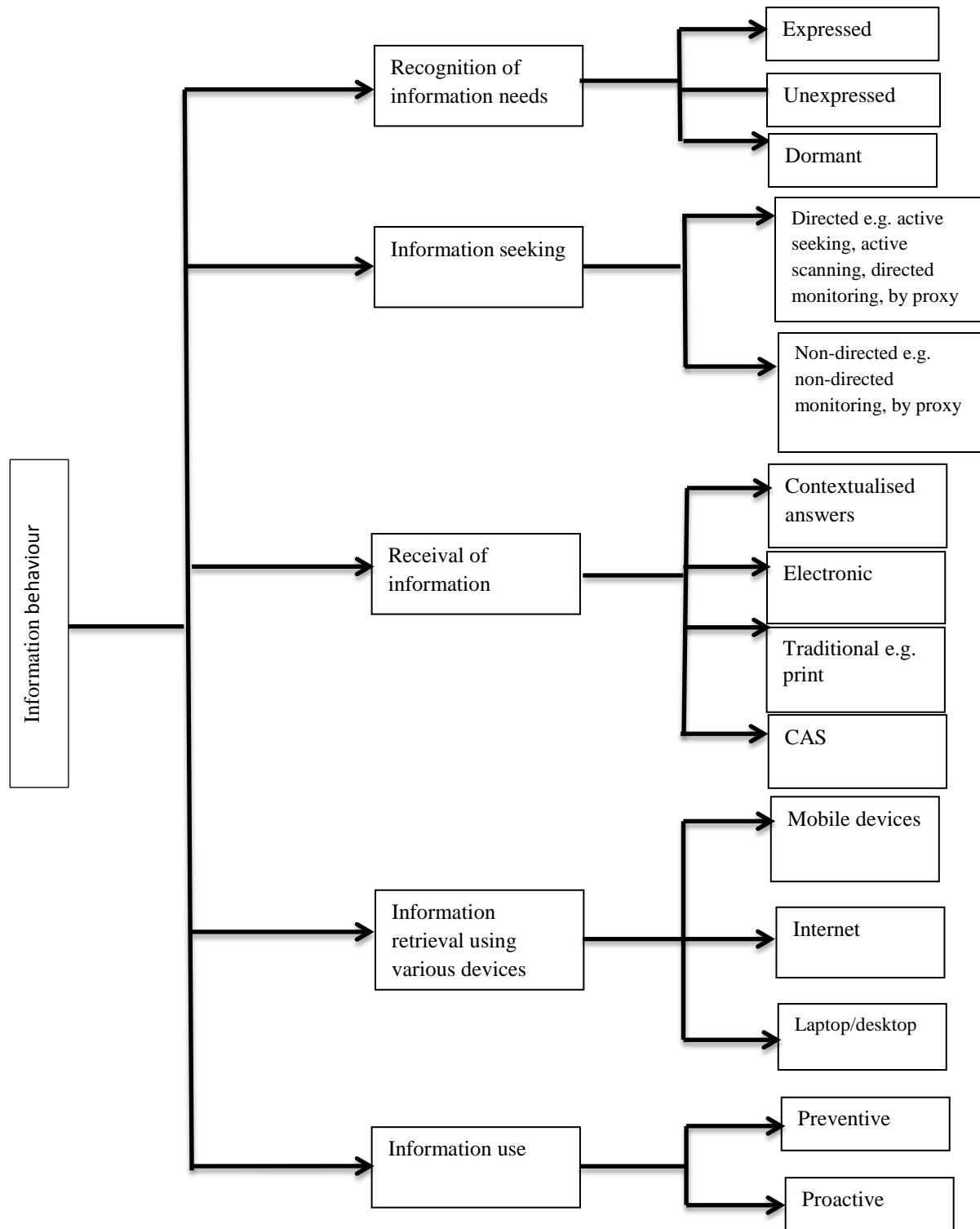


Figure 6. 1: Key activities of information behaviour that portray findings of this study

Pregnant women have argued that they have information needs on pregnancy (Fenwick *et al.*, 2015; Das & Sarkar, 2014); their information needs vary from before delivery to after delivery

¹⁰ By proxy can be directed or non-directed (e.g. somebody searching on behalf of a pregnant woman without being asked)

(Song *et al.*, 2013). Findings from this study found that pregnant women needed information on safety of the baby, medication, diet and supplement etc. before delivery while information on taking care of the baby, skin care, life after pregnancy etc. were needed after delivery.

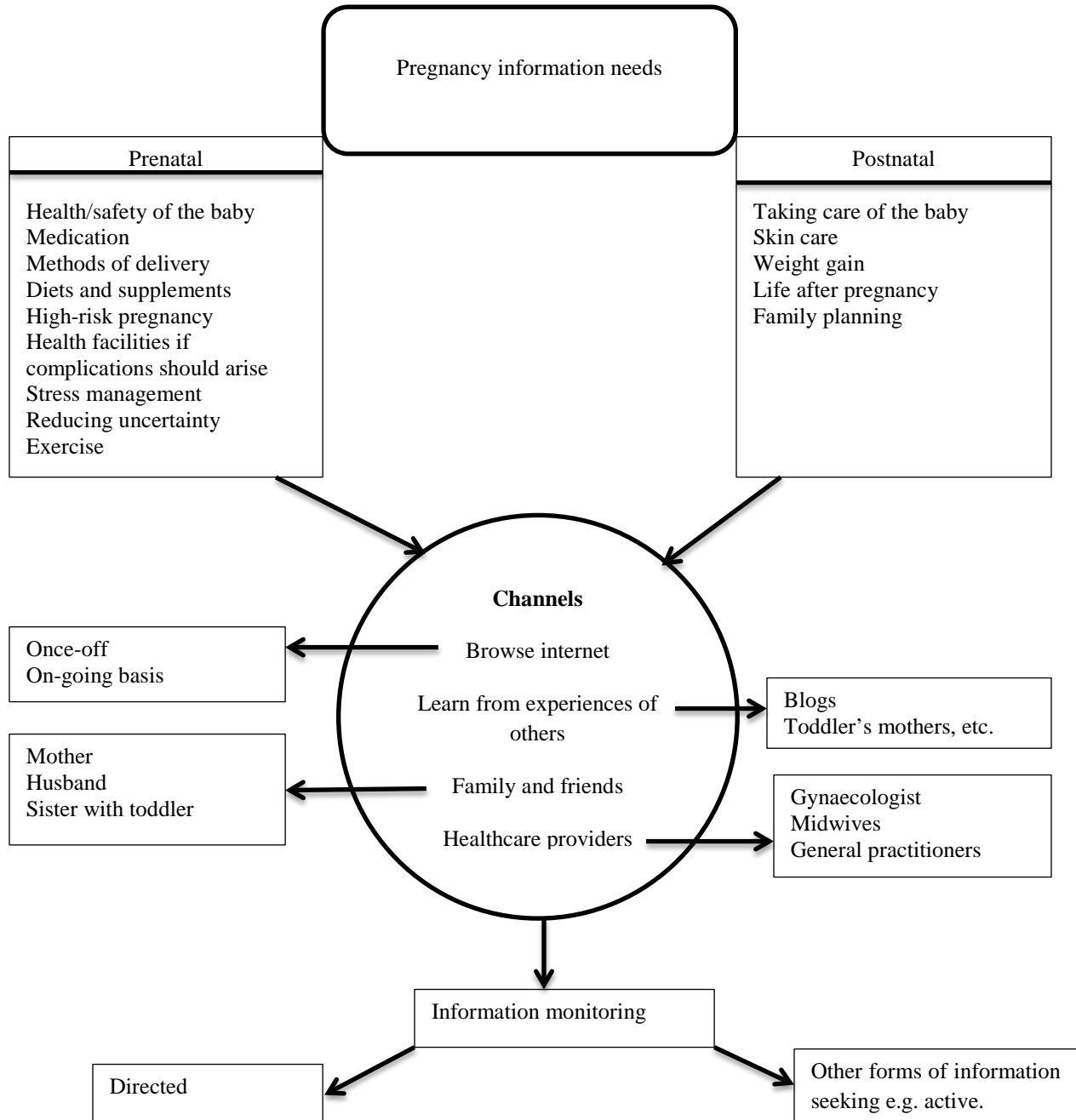


Figure 6. 2: The pre and postnatal information needs of pregnant women and potential of information monitoring

6.5 CONCLUSION

Figure 6.1 depicts the key activities of information behaviour that stood out from the findings of this study, these are similar to what McKenzie calls information practice. The model identified recognition of information needs, information seeking, receipt of information, information retrieval using various devices and information use of pregnant women. It is important to have better insight into their expressed and unexpressed information needs as well as dormant information needs and understand how they seek information, in order to assist them and proffer efficient and effective information provision and services, and especially advice on information monitoring.

Figure 6.2 illustrates some of the pre and postnatal information needs experienced by pregnant women and potential of information monitoring. It also displays the channels and ways in which they keep abreast with pregnancy-related information.

The McKenzie model supports generalisability and transferability also of this study on the information behaviour of pregnant women. Generalisability and transferability indicate that a model can be used in a similar context. In this case the McKenzie model guided this study on the information behaviour of pregnant women and especially their needs for information monitoring. It also supports the information behaviour of pregnant women in staying abreast of pregnancy-related information. The adapted model presented in Table 6.1 can also be generalised and is transferable to other similar contexts.

This chapter addressed the triangulation of data and comments on the suitability of McKenzie's model of information practices for supporting the information behaviour of pregnant women. Two new models were illustrated, one for understanding the key activities of information behaviour that stood out from the findings of this study and the second model for providing insight into the pre and postnatal information needs of pregnant women and potential of information monitoring.

The next chapter is the final chapter. It summarises the findings, recommendations and conclusion offered by the study.

CHAPTER 7

FINDINGS, RECOMMENDATIONS AND CONCLUSION

7.1 INTRODUCTION

This is the final chapter of this study. It reflects on meeting the purpose and objective of the study. It highlights the summary of conducting the empirical study, summary of findings for research sub-problem and sub-questions, limitations of the study, value of the study from both practical and theoretical points of view, recommendations for theory and practice and provides recommendations for further research. It focuses on summarising the findings based on the literature analysis reported in Chapter 2, data analysis reported in Chapter 5 and triangulation in Chapter 6. Answers to the research problem and sub-problems are also provided.

7.2 PROBLEM STATEMENT, RESEARCH QUESTION AND SUB-QUESTIONS

Since the internet and CAS available through the internet can be a valuable source of the latest information for pregnant women, it is necessary to understand their information behaviour and needs for CAS and information monitoring, as well as sources of CAS that might be of specific interest to pregnant women requiring information on an on-going basis. The problem statement thus concerned the information behaviour of pregnant women and the way in which CAS can help to meet their information needs:

What are the information needs and information behaviour of pregnant women, with specific reference to needs to monitor new information and the use of current awareness services?

To address the problem, the following research sub-questions had to be answered:

- What has been reported in the subject literature on the information behaviour of pregnant women and related groups?
- What has been reported in the subject literature on the use of information monitoring and CAS with regard to healthcare and everyday life contexts?
- What are the information needs of pregnant women?
- What is the purpose of information seeking by pregnant women?
- What is the importance of information monitoring to pregnant women?

- What problems do pregnant women face in seeking information to keep up with the latest information?
- How can pregnant women use CAS?

7.3 REFLECTION ON MEETING THE PURPOSE AND OBJECTIVES OF THE STUDY

The purpose and objectives of the study were to determine the information needs and purposes for information seeking, the importance of information monitoring, problems faced during information seeking and determine how CAS can be used. The literature analysis in Chapter 2 noted that pregnant women have unmet needs for information, and some of their information needs could be met through information monitoring and CAS. Findings from this study confirm their interest in keeping up to date with new information. They are interested in monitoring some information on an on-going base and some once-off.

7.4 SUMMARY OF CONDUCTING THE EMPIRICAL STUDY

The process of empirical data collection was carried out between August and October 2015. The study involved thirty-seven pregnant women visiting two private medical practices of gynaecologists in Pretoria, South Africa. An explanatory sequential design mixed methods research approach was adopted for the study, collecting and analysing both quantitative and qualitative data.

The study adopted the use of a self-administered print questionnaire and face-to-face interviews according to a semi-structured interview schedule as data collection techniques. Thirty-seven participants completed the questionnaires and eleven of the thirty-seven participated in the follow-up interview. Not all who were approached were willing to participate.

The researcher received ethical clearance from the EBIT Research Ethics Committee and the research ethics committee of the Faculty of Health Sciences, University of Pretoria. Permission was also solicited from two gynaecologists located in Pretoria to involve some of their patients (pregnant women) in the study.

The researcher ensured confidentiality in dealing with the participants by ensuring that she alone had access to the raw data gathered from the questionnaires and interviews. Furthermore, data that could be linked to the names of participants was safely locked away in the researcher's

password-protected computer. For the purpose of anonymity, the participants' identity and the sites of data collection were not revealed; rather codes were used for the participants.

Reliability and validity were ensured in the study by carrying out the process of triangulation and pilot-testing the questionnaires and interview schedule. Questions were developed from findings from the subject literature. Thematic analysis was used for the qualitative analysis.

7.5 SUMMARY OF FINDINGS FOR RESEARCH SUB-PROBLEMS

This section will briefly report the findings for each of the sub-problems noted in section 7.2.

7.5.1 Sub-question 1: What has been reported in subject literature on the information behaviour of pregnant women and related groups?

Information behaviour is explored better when studied in a specific context, in this case pregnant women (Case, 2006). Although pregnant women are very important to society, literature on their information needs and information behaviour is rather limited. This study can therefore make a good contribution to the subject literature.

Several findings from the subject literature were important for this study and guided data collection. Pregnant women are active seekers of information but factors such as religion, ethnicity and level of education could influence their information behaviour (Aborigo *et al.*, 2014; Das & Sarkar, 2014; Farih *et al.*, 2014). Pregnant women consult different information sources to reduce their uncertainty regarding pregnancy (Forster & Newton, 2014; Wennberg *et al.*, 2013). These sources, which are discussed in Chapter 2, include their healthcare providers, internet websites, magazines, pamphlets etc. (Al-Ateeq & Al-Rusaies, 2015; Wright, Biya & Chokwe, 2014). Self-care, safety of the fetus and healthy delivery are very important to pregnant women.

7.5.2 Sub-question 2: What has been reported in subject literature on the use of information monitoring and CAS with regards to healthcare and everyday life contexts?

Technological developments such as the internet and mobile technology have opened up more opportunities for people dealing with everyday life situations such as health, pregnancy and the need to stay abreast of new information, findings and trends (Xu, 2012; Barr, 2006). Although the use of CAS has been reported for many years in various professional sectors, including healthcare (Hughes & Glueckert, 2014; Witman & Stern, 2014; Fourie & Classen-Veldsman,

2007), nothing could be traced on pregnant women. Although information monitoring has been noted in a few publications (Fong, 2012; Liu *et al.*, 2012; Liu *et al.*, 2002), nothing could be found in literature on everyday life contexts. Information monitoring is useful for keeping recipients abreast of new information, events, trends and knowledge. Information monitoring could also assist with keeping track of useful information (Fong, 2012; Liu *et al.*, 2012; Kassel, 2000).

7.5.3 Sub-question 3: What are the information needs of pregnant women?

Literature on pregnant women has noted that they have various information needs at different stages of pregnancy (Aborigo *et al.*, 2014; Das & Sarkar, 2014). Pregnant women are faced with unmet information needs, which could be expressed or unexpressed (Fourie, 2012; Shenton, 2007) and their information needs can also be dormant.

Since pregnant women need pregnancy-related information, it is important to understand their information behaviour regarding the needs in order to assist them with information provision, communication and other forms of support. Information needs have been noted to increase levels of anxiety and uncertainty and these negative emotions could affect pregnant women negatively (Katopol, 2012; Savolainen, 2011). Provision of health literacy sessions by libraries, the availability of more health information, especially on preventive health in readable format, and allocation of reasonable time to patients during consultation with healthcare providers are key for reducing some needs for information of pregnant women. Healthcare providers may have more insight and answers to some of the needs. Such understanding can enable them to reduce the uncertainties experienced by pregnant women by means of information provision and emotional support.

7.5.4 Sub-question 4: What is the purpose of information seeking by pregnant women?

Pregnant women consult various information sources and channels when seeking information on keeping their fetuses healthy and safe (Grimes, Forster & Newton, 2014). They are active seekers of information; however, they encounter barriers in their search for information on pregnancy. In spite of the challenges, they attempt to ensure healthy outcomes for themselves as well as for the fetus.

Women make many important health-related decisions in order to stay healthy and alive during pregnancy. Information seeking is triggered by the quest to make informed decisions on issues such as method of delivery, medication, diets and supplements, etc.

7.5.5 Sub-question 5: What is the importance of information monitoring to pregnant women?

Information monitoring promotes staying up to date with new information (Hughes & Glueckert, 2014; Fong, 2012); this was discussed in Chapter 3. Since pregnant women are actively involved in seeking pregnancy-related information, information monitoring is beneficial for keeping them abreast of new health information and meeting some of their information needs.

Information monitoring could also provide pregnant women with relevant information that can assist in making decisions on their health and their newborn children. Internet CAS are cheap because many are available free of charge once the recipient is connected to an internet server. Information monitoring is a cost-effective way of staying abreast of new information on on-going bases.

7.5.6 Sub-question 6: What problems do pregnant women face in seeking information to keep up with the latest information?

Finding answers to needs expressed by pregnant women can be challenging, according to the literature (Bass, Rodgers & Baker, 2014; Wright, Biya & Chokwe, 2014). It was confirmed in Chapter 2 that pregnant women face some challenges when seeking information, especially from their healthcare providers and families. Insufficient time with their healthcare providers during consultation, contradictory and/or unclear online information, cultural beliefs, insufficient access to the internet, feelings of embarrassment to talk about pregnancy and forgetting important information because of being pregnant are some of the challenges pregnant women face when attempting to keep up with the latest information. Level of education, income level and supportive spouses are a few of the factors that may influence information seeking in pregnant women.

7.5.7 Sub-question 7: How can pregnant women use CAS?

It was confirmed in Chapter 3 that CAS, especially internet CAS, are useful for reducing pregnant women's anxiety and uncertainty concerning pregnancy. Findings from the empirical data revealed that the participants wanted pregnancy-related information in more readable

formats. CAS could also offer them cheap and timely health information on an on-going base throughout pregnancy and afterwards.

Internet CAS can be used to recognise reliable websites (especially those owned by professional bodies) and they can subscribe to alerts on health websites that cater for pregnancy and parenting. Pregnant women can also subscribe to electronic TOC of pregnancy-related online journals. They can join and participate in discussion groups and subscribe to e-newsletters and e-zines to keep them abreast of new and relevant health information. Mobile technology and devices can be used to promote health literacy and remain informed (Lau *et al.*, 2014; Waring *et al.*, 2014).

7.6 LIMITATION OF THE STUDY

This study used only participants visiting two more affluent medical practices of gynaecologists in one city, namely Pretoria (South Africa). The empirical findings in terms of the information needs and information behaviour of the pregnant women might be different from those concerning women residing in townships and rural settlements, and possibly those living in other countries.

Although thirty-seven participants constitute a small-scale study, the number is considered acceptable for a qualitative study of this nature. In addition to detailed questionnaire data further depth was added by the eleven interviews.

7.7 VALUE OF THE STUDY

7.7.1 Practical value

- This study was able to shed more light on the information needs of pregnant women by unveiling their various expressed and unexpressed needs. It also reveals the information needs that are typical of various stages of pregnancy and after pregnancy.
- This study was able to create awareness among pregnant women on ways to stay abreast of new health-related information.
- This study enlightens them on recognising diverse sources and channels of information. It also exposed them to opportunities and services capable of keeping them updated with new pregnancy-related information throughout pregnancy and after delivery.

- This study was able to confirm the importance of some health topics (potential information needs) to pregnant women such as medication, diets and supplements, obstetrics danger signs, the effect of age on pregnancy, Down Syndrome, etc. These identified needs could foster effective and efficient information provision to them.
- This study highlighted preferences for information sources for different kinds of needs and revealed the need to be considered by healthcare providers and institutions.
- Various resources useful for information monitoring were identified, including specific examples listed in Appendix G. The study holds value for pregnant women, healthcare providers, libraries, community information services and medical facilities in the sense that the resources in Appendix G can be approved from a medical point of view and brought to the attention of stakeholders.
- The study exposes some of the challenges faced by pregnant women when seeking pregnancy-related information. The identified problems include unclear/or contradictory information, insufficient access to the internet, insufficient access to information sources other than the internet and short-remembering span.
- This study highlighted preferences for information sources for different kinds of needs and revealed the need to be considered by healthcare providers and institutions

7.7.2 Theoretical value

Having explored the McKenzie model of information practices, the study was able to test more information seeking activities, namely directed monitoring, passive seeking and accidental encountering. This proves the flexibility and generalisability of the model for a different group of pregnant women, in a different healthcare context (i.e. medical practices of gynaecologists), and a different country - South Africa.

The study contributes to the theory of information behaviour of pregnant women with specific reference to their information seeking. The study confirms the importance of understanding ELIS in healthcare. The study affirms that positioning theory in terms of discursive interaction between healthcare provider and pregnant women is important for influencing information seeking. It also confirms the importance of studying the pregnant women in progression through their pregnancy. McKenzie's information practices are similar to what others (such as Case, 2006; Wilson, 1999) termed information behaviour.

7.8 RECOMMENDATIONS

7.8.1 Recommendations for practice

This study recommends:

- Improvement of health information to pregnant women and appropriate information services. Health information literacy sessions can be presented to pregnant women and their spouses by libraries and libraries can advise them on appropriate services especially drawing on properly qualified health professionals.
- Provision of health information in bit-sized and readable formats, especially for vulnerable women (i.e. poor), is important in order to inform them of the importance of prenatal visits during pregnancy. Prenatal visits are important to ensure healthy outcomes for the baby and mother. It also reduces uncertainty and can counter maternal and infant mortality during pregnancy and delivery. Pregnancy-related information can also be made more accessible and available in different formats.
- The use of variety of sources e.g. healthcare providers and pamphlets etc. for information consolidation.
- The healthcare sector can make answers on general issues more available to satisfy the needs through pamphlets, brochures, magazines, SMSs and CDs in various healthcare facilities.
- Design of information retrieval systems (such as portals). Portals on pregnancy can offer links to CAS such as blogs, magazines and even medical databases such as Pubmed for SDI profiles for pregnant women with backgrounds in healthcare. Pregnancy-related portals could encourage women to check reliable internet WWW sites and prepare for visits with a list of questions.
- Offering of group prenatal classes in healthcare facilities in order to enable women to learn from one another during prenatal visits. The importance of information, reliable websites and learning from the experiences of others need to be highlighted. This could encourage information sharing and exchange among pregnant women, since some complained about insufficient time with their healthcare providers during consultation time.

- Provision and promotion of health information through information monitoring and CAS on mobile devices and apps in order to keep pregnant women abreast of relevant health information.
- Allocation of reasonable time to patients during consultation with healthcare providers. The services of doctor extender could be adopted.

7.8.2 Recommendations for theory

The concept of information behaviour, specifically information seeking, has been explained holistically both from the active and passive points of view. More studies can explore the way in which interactional practices (especially with healthcare providers) influence the information seeking of users in everyday life contexts. More focus should be on the different kinds of information seeking and how these types of information seeking can help to raise recognition of dormant information needs.

Only a few studies exist on the information behaviour of pregnant women; more studies are needed to explore how information provision can reduce maternal and infant mortality in Africa, for the full trajectory of pregnancy starting with the time of immediately before conception to sometime after giving birth.

7.9 RECOMMENDATIONS ON FURTHER RESEARCH

This study found that pregnant women are active seekers of information, but not all their information needs are met. It is recommended that future research should investigate:

- Unexpressed needs of pregnant women in everyday life (i.e. needs that are revealed in their discussions). A closer look at different types of information needs (especially the unexpressed and dormant) that were not fully explored in this study is also needed.
- The use of mobile technology and apps in meeting the needs of pregnant women and providing health information especially regarding information monitoring and CAS.
- The use of information in coping with the various stages of pregnancy i.e. exploring the value of a process (i.e. stage) model such as developed by ELIS.
- The study explored the information needs of pregnant women in affluent areas. More studies can explore the expressed and unexpressed information needs of poor pregnant women.

7.10 CONCLUSION

The purpose of the study was to determine the information needs and purposes for information seeking, the importance of information monitoring, problems faced during information seeking and to determine how CAS can be used by pregnant women. This was able to summarise the chapter findings based on literature analysis and data analysis. Recommendations were provided from the practical and theoretical points of view. Suggestions for further research were also considered.

In the study the healthcare sector and pregnancy were contextualised to understand the needs of women during pregnancy, and prenatal visits were identified as a necessity for promoting maternal and infant health. Active involvement with information has been noted among pregnant women, although they encounter various challenges when attempting to meet some of the information needs during pregnancy and immediately afterwards. Information monitoring and CAS are services that continually update their recipients with new information. These services are relevant in meeting some of the unmet needs of pregnant women both during and immediately afterwards. It can also help with the recognition of dormant information needs. Mobile technology and devices are seen as easy channels for keeping pregnant women abreast of health information.

Not all women are equally interested in CAS but it might help to address some information needs and supplement active once-off or retrospective searches.

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APPENDIXES

APPENDIX A: QUESTIONNAIRE

Questionnaire on information needs, information seeking and the need to monitor new information during pregnancy

This is an exploratory study to identify the information needs of pregnant women and their interest in monitoring new information on pregnancy and other issues related to their situation as expecting mothers. The findings will be used to make recommendations on means of information monitoring and current awareness services relevant to pregnant mothers.

The researcher will be available to deal with questions at the time when participants complete the questionnaire. She will also complete questionnaires on behalf of participants, if necessary.

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SECTION A: PERSONAL INFORMATION AND INFORMATION RELATED TO PREGNANCY

(1) Stage of pregnancy: (please tick only the most appropriate option)

- | | |
|--------------------|--------------------------|
| 1-10 weeks | <input type="checkbox"/> |
| 11-20 weeks | <input type="checkbox"/> |
| 21-30 weeks | <input type="checkbox"/> |
| 31-40 weeks | <input type="checkbox"/> |
| More than 40 weeks | <input type="checkbox"/> |

(2) Number of pregnancies: (please tick only the most appropriate option)

- | | |
|-----------------------------|--------------------------|
| This is my first pregnancy | <input type="checkbox"/> |
| One full-term pregnancy | <input type="checkbox"/> |
| Two full-term pregnancies | <input type="checkbox"/> |
| Three full-term pregnancies | <input type="checkbox"/> |

- Four full-term pregnancies
- Five or more full-term pregnancies
- I have been pregnant before, but it was not a full-term pregnancy
- Prefer not to say

(3) Marital status: (please tick only the most appropriate option)

- Married
- Single
- Divorced
- Widow
- Prefer not to say

Other option you want to bring to our attention:

(4) Highest level of education: (please tick only the most appropriate option)

- Primary school – but not fully completed
- Primary school completed
- High school, but grade 12 not completed
- Grade 12
- Diploma
- Bachelor’s degree
- Honours degree
- Master’s degree
- Doctoral degree
- Other post-high school qualification(s)

(5) Approximate number of prenatal visits for the current pregnancy: (please tick only the most appropriate option)

1	2	3	4	5	6	More than 6
---	---	---	---	---	---	-------------

(6) Reasons for prenatal visits: (please tick all options that apply)

- Routine check-up
- Complications
- Obstetrics danger signs
- Other (please specify).....
-

SECTION B: INFORMATION NEEDS

(7) Have you ever asked or looked for information on the following topics during your current pregnancy?

Information needs during current pregnancy	Yes	No
Medication		
Diet and supplements		
Diseases and treatment		
Exercise		
Labour and methods of delivery		
Health policies regarding maternity care		
Well-being of the fetus		
Stress management		
Support against abuse		
Health facilities if complications arise		
Obstetric danger signs		
Support to avoid unhealthy lifestyles e.g. smoking, alcohol intake, substance abuse, etc.		
Prenatal care		
Rest		
Genetic counselling		

(8) Please indicate to what extent you agree on the possibility that you *might* need information on the following topics during your current pregnancy:

Information needs during current pregnancy	Strongly agree	Agree	Disagree	Strongly disagree
Medication				
Diet and supplements				
Diseases and treatment				
Exercise				
Labour and methods of delivery				
Health policies regarding maternity care				
Well-being of the fetus				
Stress management				
Support against abuse				
Health facilities if complications arise				
Obstetric danger signs				
Support to avoid unhealthy lifestyles e.g. smoking, alcohol intake, substance abuse, etc.				
Prenatal care				
Rest				
Genetic counselling				
Other issues on which you might need information (please specify)				

(9) Please indicate to what extent you agree on the possibility that you *might* need information on the following topics after your current pregnancy:

Possibility that information needs might be experienced after the current pregnancy	Strongly agree	Agree	Disagree	Strongly disagree
Taking care of the baby				
Family planning				
Losing weight				
Baby skin care				
Employment opportunities				
Postnatal care				
Are there any other issues on which you think you might need information and that you are willing to share with us? (please specify)				

SECTION C: PREFERENCES FOR INFORMATION SOURCES

(10) Please indicate the importance of the following information sources to you in your current pregnancy:

Preference for information sources	Not important	Slightly important	Important	Very important
Friends				
Family members				
Magazines				
Search engines				
Electronic newsletters				
Brochures				
Pamphlets				
Bulletins				
Healthcare providers				
Blogs				
Text messages (sms)				
Books				
Internet				
E-mail				
Social networks				
Discussion groups (online forums)				
Television programmes				
Radio programmes				
Audio-visual materials				
Are there any other information sources that are important to you and that you are willing to mention to us? (please specify)				

SECTION D: DEVICES FOR ACCESSING INFORMATION

(11) Please tick all devices that you use for accessing information.

Mobiles/cell phones/smartphones	
Tablets	
Proxy (asking other people to use their devices to search on your behalf)	
Desktop/laptop	
Other (please specify)	

SECTION E: INFORMATION SEEKING AND FACTORS AFFECTING INFORMATION SEEKING

(12) Please specify the chances of the following ways of information seeking happening during your current pregnancy:

Active seeking (turning to sources for a specific purpose)	Already happened	Highly likely	Likely	Unlikely	Highly unlikely
I will ask my healthcare provider(s) for pregnancy-related information					
I will make a list of questions prior to my appointment with my healthcare provider(s)					
I will search for information by buying pregnancy-related information materials or publications					
I will ask friends and family members for pregnancy-related information					
Active scanning and browsing (turning to sources in the hope that you might find something of interest)					
I will browse through bookshelves in bookshops for pregnancy-related information					
I will browse through bookshelves in libraries for pregnancy-related information					
I will look around in the healthcare provider's consulting rooms for pregnancy-related information					
I will check in maternity centres for pregnancy-related information					
I will look for information on pregnancy by flipping through information materials on pregnancy and related issues					
I will browse the internet for information on pregnancy and related issues					
Non-directed monitoring of information (pursuing no specific goal)					
I might glance through magazines					

or newspapers for other purposes and then find pregnancy-related information					
I could watch tv or listen to a radio programme, and then come across useful information on pregnancy					
I might find pregnancy-related information in unfamiliar places and circumstances, e.g. seeing a mother pushing a double baby stroller					
Directed monitoring (monitoring sources on an on-going bases for a specific purpose)					
I might subscribe to magazines or relevant publications on pregnancy					
I might find pregnancy-related information through e-mail alerts					
I could receive pregnancy-related information by monitoring the internet websites					
By proxy (getting information through the help of somebody else searching on your behalf)					
I will ask other people to search on my behalf for pregnancy-related information					
I will rely on other people to refer me to information or people with information					
Family members, friends, colleagues and associates scan various pregnancy-related information sources on my behalf and bring information to my attention					
Passive seeking and accidental encountering (getting information without asking)					
I will get information and advice when people see my protruded stomach					
I will pick up pregnancy-related information from other people's discussions, e.g. In health care provider's consulting room, at the hairdresser					

I will pick up pregnancy-related information when friends and family bring pregnancy issues to my attention					
---	--	--	--	--	--

SECTION F: PROBLEMS ENCOUNTERED WHEN SEEKING INFORMATION

(13) Please indicate to what extent the following problems apply to you when you seek information during your current pregnancy:

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
I feel embarrassed to ask questions on pregnancy				
Information and advice given are often unclear and/or contradictory				
I do not have access to the internet				
I lack access to information sources other than the internet				
The attitude and behaviour of healthcare providers are problematic.				
Insufficient discussion time with healthcare provider(s) is available				
I am inhibited to seek information because my partner is not supportive				
My cultural beliefs forbid me to ask pregnancy-related information from people who are not relatives				
If I get information, I find it difficult to remember				

(14) Would you like to provide more detail on any of the problems noted?

(15) Would you like to state any other problems that have not been noted?

(16) Have you searched for pregnancy-related information up to this point of your current pregnancy?

a) Yes

b) No

If yes, can you state up to five of the most important issues you discovered?

(17) If no, can you please provide a little more information if there are reasons apart from the problems that have already been covered in this questionnaire?

SECTION G: NEED FOR KEEPING UP TO DATE WITH NEW INFORMATION ON PREGNANCY ISSUES

(18) Please indicate your interest in keeping up to date with new information.

	Not interested at all	May consider keeping up to date	Interested	Highly interested
I need to receive updated new pregnancy-related information				
I need to be updated about free access to pregnancy-related information				
I need to keep up to date with supportive information, e.g. information on avoiding abuse and violence				
I need to keep up to date with career development information				
I need to take note of daily events and trends				
I need information on non-pregnancy issues such as daily jokes, horoscopes and weather forecasts				

(19) Are there any other reasons why you need to keep up to date with new information?

(20) If you think that there is no reason to keep up to date with new information, will you please explain why?

SECTION H: MEANS TO KEEP UP TO DATE WITH NEW INFORMATION

(21) Please rate your opinion on means of keeping up with new information.

	Strongly agree	Agree	Disagree	Strongly disagree
Healthcare providers provide sufficient resources to keep me up to date with information (i.e. providing information on an on-going basis)				
My circle of friends is sufficient to keep me up to date with new information				
It is sufficient to browse internet websites to keep up with new information				
Subscribing to a selection of internet resources is sufficient to keep me up to date with new information				
New books, magazines, newsletters, pamphlets and brochures are useful sources to keep me up to date with new information				

(22) Please state the topics/issues on which you want to be updated.

(23) Why do you want to be updated on the stated topics/issues?

(24) Did the questionnaire help you to become aware of information you may need during and after your pregnancy?

- a. Yes
- b. No

Will you please explain your answer?

Did the questionnaire help you to become aware of the need to keep up to date with new information?

- a. Yes
- b. No

Will you please explain your answer a little more fully?

Is there anything else you would like to bring to my attention?

Thank you for your participation

APPENDIX B: INTERVIEW SCHEDULE¹¹

Current awareness services and information monitoring supporting the information behaviour of pregnant women

Schedule of topics for interviews with pregnant women (this schedule will also be used to guide the focus group interviews)

This is an exploratory study to identify the information needs of pregnant women and their interests in monitoring new information on pregnancy and other issues related to their situation as expecting mothers. Findings will be used to make recommendations on means of information monitoring and current awareness services relevant to pregnant mothers, and on the theory of information behaviour.

Researcher: Olubukola M. Ogundele, 0846175375; olubukola_ogundele@yahoo.com

Supervisor: Prof Ina Fourie (Department of Information Science, University of Pretoria); (012) 420-5216; ina.fourie@up.ac.za

Interview topics

- 1) Discussion of the information needs of women during their current pregnancy
 - a. Experiences of information needs they would like to note from earlier experiences of pregnancy, if applicable
- 2) Discussion of issues on which they would like to monitor new information
 - a. During their pregnancy
 - b. Immediately after the pregnancy
 - c. Issues resulting from their pregnancy
- 3) Discussion of ways of staying abreast with pregnancy-related information
 - a. Ways and means they have used up to the time of the interview
 - b. Opinion on other ways suggested by the researcher
- 4) Barriers encountered during information seeking and staying abreast of new information
- 5) Sources that would be preferred for staying abreast with new pregnancy-related information
- 6) Other issues that may arise from responses to the questionnaire
- 7) Additional information they would like to share related to the focus of the study

¹¹ The researcher's surname is changed from Ogundele to Akanbi.

APPENDIX C: INFORMED CONSENT FORM FOR QUESTIONNAIRE

Informed consent form for questionnaire (to obtain permission from participants in the research project)

*This form must be signed by all research participants and will be kept on record by the researcher, **Olubukola M.Ogundele**¹². As a participant, you will also receive a copy of this form.*

Title of research project: Information monitoring and current awareness services supporting the information behaviour of pregnant women.

The research project is in partial fulfilment of a master's degree in the Department of Information Science, University of Pretoria under the supervision of Prof Ina Fourie. It is an exploratory study to identify the information needs of pregnant women during their period of pregnancy and immediately after giving birth. The emphasis is especially on interest in keeping up with new information on pregnancy and other issues related to the situations of expecting mothers. The findings will be used to make recommendations on means of keeping up with new information during pregnancy and especially on using the internet for this. It is a study of information behaviour and in this field the terms "information monitoring" and "current awareness services" are used when discussing the need for and means to keep up with new information. If you are participating in the study and if you are interested, a summary of the findings and recommendations can be made available to you.

The study and data collection have been approved by the Departmental Research Committee (Department of Information Science), EBIT Research Ethics Committee and the Faculty of Health Sciences Research Ethics Committee – all from the University of Pretoria. The application to conduct the study, the questionnaire and interview schedule were also submitted to the gynaecologist whose practice you are visiting today for approval. He/she gave permission that you may be *asked* to participate in the study. **Your participation is, however, absolutely voluntary.** Although your participation will be appreciated, you are under no obligation: your time and privacy will be respected under all circumstances. You may at any time withdraw during the data collection.

There are no risks involved in participating in the study, and no harm or endangerment is foreseen. The study does not require medical records in any form, and the collection of data and

The researcher's surname is changed from Ogundele to Akanbi.

the reporting of data will not impact on your doctor-patient relationship. Questions on your stage of pregnancy, number of pregnancies, marital status, problems encountered during information seeking and level of education are all asked since these might have an impact on your information needs. If you choose not to answer these questions, the rest of your answers will still be useful to the research project. The study does not intend to determine your satisfaction with the information provided by the doctors and other healthcare providers, but to focus on your needs for information and for keeping up with new information during your period of pregnancy and immediately thereafter.

All data will be kept confidential and your anonymity will be ensured. A password-protected Word document will be used for notes and transcriptions, and completed questionnaires will be kept in a safe place. Your name and the name of your gynaecologist will not be mentioned when reporting the findings of the study. If you prefer to approve the notes and transcription of the discussion/focus group reflecting your input before the data is used, it will be arranged.

There is no remuneration for participating in the study. A summary of the findings and recommendations can, however, be made available to you.

The data gathered from the study will be published in a master's dissertation, and possibly also as one or more conference papers and/or articles. Your name and the name of the treating gynaecologist or practice where the data were collected will not be mentioned.

I (your name)..... hereby voluntarily agree to participate in the project as explained to me by Olubukola M. Ogundele and according to the information provided in this form.

- The nature and objective of the project and the fact that there will be no safety and health implications have been explained to me and I understand them.
- I understand my right to choose whether to participate in the project, that I am under no obligation, and that I might withdraw from the study.
- I understand that the information furnished will be handled confidentially.
- I am aware that the results of the study may be used for the purposes of publication – i.e. a dissertation, conference paper(s) and article(s).

I agree to participate in the study	Yes	No
I want to receive a summary	Yes	No

If you want to receive a summary of the findings and recommendations, please provide an email address:

I understand that upon signature of this form, I will be provided with a copy.

Participant signature: _____ Date: _____

Witness signature: _____ Date: _____

Researcher signature: _____ Date: _____

Researcher: Olubukola M. Ogundele; 084-6175-375, olubukola_ogundele@yahoo.com

Supervisor: Prof Ina Fourie (Department of Information Science, University of Pretoria); (012) 420-5216; ina.fourie@up.ac.za

APPENDIX D: INFORMED CONSENT FORM FOR INTERVIEW

Informed consent form for interviews (to obtain permission from participants in the research project)

*This form must be signed by all research participants and will be kept on record by the researcher, **Olubukola M.Ogundele**¹³. As a participant, you will also receive a copy of this form.*

Title of research project: Information monitoring and current awareness services supporting the information behaviour of pregnant women.

The research project is in partial fulfilment of a master's degree in the Department of Information Science, University of Pretoria under the supervision of Prof Ina Fourie. It is an exploratory study to identify the information needs of pregnant women during their period of pregnancy and immediately after giving birth. The emphasis is especially on interest in keeping up with new information on pregnancy and other issues related to the situations of expecting mothers. The findings will be used to make recommendations on means of keeping up with new information during pregnancy and especially on using the internet for this. It is a study of information behaviour and in this field the terms "information monitoring" and "current awareness services" are used when discussing the need for and means to keep up with new information. If you are participating in the study and if you are interested, a summary of the findings and recommendations can be made available to you.

The study and data collection have been approved by the Departmental Research Committee (Department of Information Science), EBIT Research Ethics Committee and the Faculty of Health Sciences Research Ethics Committee – all from the University of Pretoria. The application to conduct the study, the questionnaire and interview schedule were also submitted to the gynaecologist whose practice you are visiting today for approval. He/she gave permission that you may be *asked* to participate in the study. **Your participation is, however, absolutely voluntary.** Although your participation will be appreciated, you are under no obligation: your time and privacy will be respected under all circumstances. You may at any time withdraw during the data collection.

There are no risks involved in participating in the study, and no harm or endangerment is foreseen. The study does not require medical records in any form, and the collection of data and

The researcher's surname is changed from Ogundele to Akanbi.

the reporting of data will not impact on your doctor-patient relationship. The study does not intend to determine your satisfaction with the information provided by the doctors and other healthcare providers, but to focus on your needs for information and for keeping up with new information during your period of pregnancy and immediately thereafter.

All data will be kept confidential and your anonymity will be ensured. A password protected word document will be used for notes and transcriptions, and completed questionnaires will be kept in a safe place. Your name and the name of your gynaecologist will not be mentioned when reporting the findings of the study. If you prefer to approve the notes and transcription of the discussion/focus group reflecting your input before the data is used, it will be arranged.

There is no remuneration for participating in the study. A summary of the findings and recommendations can, however, be made available to you.

The data gathered from the study will be published in a master’s dissertation, and possibly also as one or more conference papers and/or articles. Your name and the name of the treating gynaecologist or practice where the data were collected will not be mentioned.

I (your name)..... hereby voluntarily agree to participate in the project as explained to me by Olubukola M. Ogundele and according to the information provided in this form.

- The nature and objective of the project and the fact that there will be no safety and health implications have been explained to me and I understand them.
- I understand my right to choose whether to participate in the project, that I am under no obligation, and that I might withdraw from the study.
- I understand that the information furnished will be handled confidentially.
- I am aware that the results of the study may be used for the purposes of publication – i.e. a dissertation, conference paper(s) and article(s).

I agree to participate in the study	Yes	No
I agree for the interview to be recorded	Yes	No
I want to verify the notes and transcription with regard to my input	Yes	No

I want to receive a summary on the findings and recommendations	Yes	No
---	-----	----

If you want to verify the notes and transcription and/or receive a summary of the findings and recommendations, please provide an email address:

.....

I understand that upon signature of this form, I will be provided with a copy.

Participant signature: _____ Date: _____

Witness signature: _____ Date: _____

Researcher signature: _____ Date: _____

Researcher: Olubukola M Ogundele.; 084-6175-375, olubukola_ogundele@yahoo.com

Supervisor: Prof Ina Fourie (Department of Information Science, University of Pretoria); (012) 420-5216; ina.fourie@up.ac.za

APPENDIX E(a): INVITATION TO PARTICIPATE IN THE STUDY



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Skool vir Inligtingtegnologie
School of Information Technology

Departement Inligtingkunde
Department of Information Science
2015

Invitation to participate in a study on the information behaviour of pregnant women - with specific reference to interest in keeping up to date with new information

I, Olubukola M. Ogundele, am a masters' student in the Department of Information Science, University of Pretoria. The title of my study is: *Information monitoring and current awareness services supporting the information behaviour of pregnant women.*

I would appreciate it if you would be willing to put time aside to participate in my study. If interested, please use the attached form to leave your name and contact details with the receptionist. Participation includes:

1. Completing a questionnaire (this is the main component)
2. In addition it would really be appreciated if you would be willing to:
 - a. Have a short interview with me (not more than 20 minutes)

Or

 - b. Participate in a group interview (i.e. a focus group interview with a few other women, taking no more than 45 minutes.) (The benefit of a group interview is that you can also gain from the experiences of other pregnant women.)

For the interview I can meet you at the coffee shop at the hospital for a cup of tea or coffee, at a time convenient to you. If you are willing to participate in the group interview, I will also arrange it at the coffee shop at the hospital at a convenient time for all.

I have ethical clearance from the University of Pretoria – Faculty of Engineering, Built Environment and Information Technology Research Ethics Committee to do the study.¹⁴ All information you share with me will be treated as confidential, and in no way will your name be linked to your answers or the name of the doctor and practice.

¹⁴ The researcher did not realise that Health Ethics is needed and did not update afterwards

Your participation will be much appreciated.

Kind regards,
Olubukola M. Ogundele; cellphone: 084 6157375;
e-mail: olubukola_ogundele@yahoo.com

Study supervisor: Prof Ina Fourie (Department of Information Science, University of Pretoria);
(012) 420-5216; ina.fourie@up.ac.za

APPENDIX E(b): FORM ACCOMPANYING THE INVITATION

Participation in a study on the information behaviour of pregnant women – with specific reference to interest in keeping up to date with new information

If you are willing to participate in the study, please write down your name and contact details, and how you would like to participate.

Name:

Phone:

Email:

Please indicate how you are willing to participate (It will be appreciated if you will participate in both the questionnaire and an interview option, but if you only have time to complete the questionnaire your input will still be highly valuable.)

	Completing a questionnaire		
	Short interview (max 20 minutes)	OR	Group interview (max 45 minutes)

APPENDIX F: RESEARCHER DECLARATION

APPLICATIONS MUST INCLUDE THE FOLLOWING STATEMENTS

Hereby I, Olubukola M. Ogundele¹⁵ in my capacity as Researcher, that

1. Research subjects will be informed, information will be handled confidentially, research subjects reserve the right to choose whether to participate and, where applicable, written permission will be obtained for the execution of the project (example of permission attached).
2. No conflict of interests or financial benefit, whether for the researcher, company or organisation, that could materially affect the outcome of the investigation or jeopardise the name of the university is foreseen.
3. Inspection of the experiments in loco may take place at any time by the committee or its proxy.
4. The information I furnish in the application is correct to the best of my knowledge and that I will abide by the stipulations of the committee as contained in the regulations.

5. Signed: _____



Date: 08/05/2015

¹⁵ The researcher's surname is changed from Ogundele to Akanbi.

APPENDIX G: CURRENT AWARENESS SERVICES RELEVANT FOR PREGNANT WOMEN

There are more examples of CAS relevant to pregnant women in Appendix G than in the text.

Journals (in South Africa) – with tables of contents

- *South African Medical Journal*; www.samj.org.za
- *South African Journal of Obstetrics and Gynaecology*; www.sajog.org.za
- *Healthcare SA Gesondheid*; www.hsag.co.za
- *Continuing Medical Education*; www.cmej.org.za

Journals (international) - with tables of contents

- *Midwifery Journal*; www.midwiferyjournal.com
- *BMC Pregnancy and Childbirth*; www.biomedcentral.com/bmcpregnancychildbirth
- *Journal of Pregnancy*; www.hindawi.com/journals/jp
- *Women and Birth*; www.womenandbirth.org
- *Journal of Obstetric, Gynecologic and Neonatal Nursing*;
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1552-6909](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1552-6909)

Magazines (in South Africa) - with tables of contents

- *Preggi Bellies*; www.preggibellies.co.za
- *Mamas and Papas*; www.mamasandpapasmag.co.za
- *Caxton Magazines*; www.caxtonmags.co.za
- *Your Pregnancy Magazine*; <http://www.yourparenting.co.za/pregnancy>
- *Your Baby*; www.yourparenting.co.za

Magazines (international) - with tables of contents

- *The Mother Magazine*; <http://www.themothermagazine.co.uk/>
- *The Bump Magazine*; <http://www.thebump.com/the-bump-magazine>
- *Pregnancy & Newborn Magazine*; www.pnmag.com

- Fit Pregnancy; www.fitpregnancy.com
- American Baby Magazine; <http://www.parents.com/american-baby-magazine/>
- Your pregnancy; www.pregnancymagazine.com

Blogs (in South Africa)

- Your Pregnancy blog; <http://www.yourparenting.co.za/blogs>
- You, Baby and I blog; <http://www.youbabyandi.com/>
- Birthingsa; <http://birthingsa.co.za/>

Blogs (international)

- The Mother Blog; <http://www.themothermagazine.co.uk/blog/>
- Pregnancy & Newborn blog; <http://www.pnmag.com/category-landing/?blogs>
- The Bump Blog; <http://blog.thebump.com/>

Newsletters (in South Africa)

- Mamas and Papas newsletters; <http://www.mamasnpapasmag.co.za/#>
- Your Pregnancy newsletters; <http://www.yourparenting.co.za/newsletters>

Newsletters (international)

- The mother newsletters; <http://www.themothermagazine.co.uk/the-mother-newsletter/>

Professional organisations (in South Africa)

- Pampers; www.pampers.co.za
- Huggies; www.huggies.co.za
- Johnson's baby; www.johnsonsbaby.co.za

Professional organisation (international)

- Text4baby; www.text4baby.org
- Baby center; www.babycenter.com

Electronic news alerts (South Africa)

- Medic alert; www.medicalert.co.za
- Power alert; www.poweralert.co.za
- Job alert; www.careerjunction.co.za

Electronic news alerts (international)

- News24; www.news24.com
- Yahoo; www.yahoo.com
- Parent24; www.parent24.com
- Health 24; www.health24.com
- Women 24; www.women24.com
- Google; www.google.com
- Medical News Today; www.medicalnewstoday.com

Online discussion groups or forums (in South Africa)

- Calora baby; <http://www.calorababy.co.za/forum/index.php>
- Moomie; <http://www.moomie.co.za/>
- Tums to teens; <http://tumstoteens.friendhood.net/>

Online discussion groups or forums (international)

- The bump; <http://www.thebump.com/community>
- Baby center; <http://www.babycenter.in/c25000192/pregnancy-forums>
- Pregnancy chat room; the Healthful Chat; <http://www.healthfulchat.org/pregnancy-chat-room.html>

Bookmarking services

- Pregnancy Services; doh.dc.gov/service/pregnancy-services

RSS feeds

- Fit Pregnancy; www.fitpregnancy.com/rss
- Medline Plus; www.nlm.nih.gov/medlineplus/rss.html