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Expectations of pregnant women prior to fetal ultrasound

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EXPECTATIONS OF PREGNANT WOMEN PRIOR TO FETAL ULTRASOUND

M MED Dissertation

Obstetrics and Gynaecology

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SUBMITTED TO THE UNIVERSITY OF WITWATERSRAND

In partial fulfilment of the requirements for the degree Master of Medicine

October 2017

DECLARATION

I declare that the work I am submitting for assessment is my own work, contains no section copied in whole or in part from any other source unless explicitly identified in quotation marks and with detailed, complete and accurate referencing. I declare this work has not been submitted to any other university or institution for the purpose of a post-graduate degree. It is being submitted for the degree of Master of Medicine (in the branch of Obstetrics and Gynaecology) at the University of the Witwatersrand, Johannesburg.

_____

Dr. E. J. Bok

Signed at Johannesburg
30 October 2017

DEDICATION

This research report is dedicated to:

My husband **Owen McMinn,** my daughters **Kristen and Mia,**

My siblings **Shonese** and **Kearne** and my parents.

Thank you for your sacrifices and support throughout my studies, I have truly been blessed.

In Loving Memory of my stepfather

Shaun Tyrone Jackson

1955-2016

ACKNOWLEDGEMENTS

I would like to gratefully acknowledge my supervisor Professor Hennie Lombaard for the suggestion of the topic, for his invaluable support, patience and guidance. I could not have been blessed with a more wonderful supervisor.

Thank you to the ultrasound department at Rahima Moosa Mother and Child Hospital. Aanisah Ahmed, Lucille Carolus, Rochelle Majola and Lettie Morodi for your interest in this study and help in accommodating me with patient interviews, I am truly grateful to all of you.

I thank Mr Christian Nyaundi for assistance with statistical analysis.

A special thank you to Doctor Susan Branch for your time, input and suggestions, I could not be more grateful.

Lastly I would like to acknowledge the women who sacrificed their time and were willing to be part of this study.

ABSTRACT

Background

Expectations and knowledge of pregnant women prior to fetal ultrasound are well documented in developed countries. Women have generally been shown to have appropriate and reasonable expectations and knowledge. The main objective of this study was to examine whether the views of women in our setting are similar to findings from studies in developed countries.

Methods

This was a descriptive study done on pregnant women attending the ultrasound department and antenatal clinic at Rahima Moosa Mother and Child Hospital.
An interview questionnaire was administered before the ultrasound scan.

Results

Two hundred and fifty women were recruited. The most frequently expressed expectation was to determine sex of baby (n=154). This was followed by wanting to know the baby's wellbeing and health (n=136). All the women interviewed had expectations.
The majority of women did not know that fetal anomalies could be detected at fetal ultrasound (n=235), this was statistically significant (p=0.003) and was correlated to educational level.
Almost half the women did not know the purpose of the ultrasound for which they were referred for (n=124).

Conclusion

Most women had appropriate expectations in keeping with studies from developed countries. Lack of education was directly linked to poor knowledge of fetal ultrasound. This study has identified areas where patient education is needed regarding fetal ultrasounds.

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1 LITERATURE REVIEW

1.1 History of ultrasound

The first fetal ultrasound was done in 1956 by obstetrician and Regius Professor of Midwifery, Ian Donald at the University of Glasgow. [1]

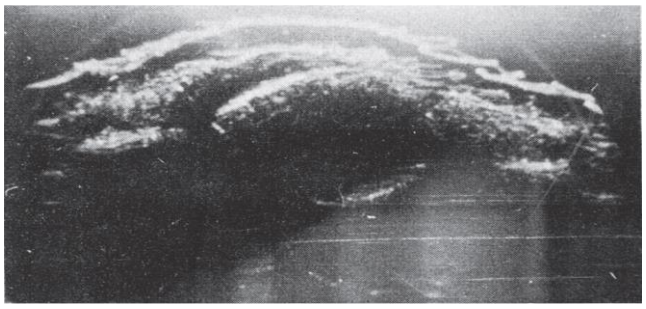


Figure 1.1 The first fetal head scanned by Donald in 1958 as copied from: Donald et al, (1958) [1]

The initial ultrasound images were crude, static and lacked grey scale. Two decades later, static ultrasound machines were replaced by real time machines. Real time scanning made it possible to diagnose a large range of fetal abnormalities.[2] By the 1980's most hospitals had introduced screening for fetal abnormalities as part of the 20 week scan.[3] Obstetric scanning was no longer confined to an elite group of experts. Although the 1950's saw the herald of ultrasound being used for clinical purposes, popularity of this new technology only picked up in the 1970's. This was mainly due to British woman wishing to see the fetus and heartbeat thus creating a closer connection to their unborn child.[3] Now in the 21st century, ultrasound technology in the monitoring of pregnancy has completely revolutionised the way in which women experience pregnancy around the world. [3]

1.2 Recommendation for ultrasound use

A routine antenatal scan is a screening procedure which is targeted at low risk individuals. Justification for the routine ultrasound is found in a Cochrane Review of ultrasound for fetal assessment in early pregnanacy.[4] The World Health Organisation has recommended that every pregnant woman have at least one ultrasound in their pregnancy.[5] In the United States, the American College of Obstetrics and Gynaecology (ACOG) recommends ultrasound examination for all pregnant women and advises against nonmedical use of prenatal ultrasonography.[6]

Performing a routine scan, particularly in early pregnancy, allows for improved assessment of gestational age and earlier detection of multiple pregnancies or unsuspected fetal anomalies.[6] A workshop organized by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) reached a consensus that "all foetuses should have a screening ultrasound for the detection of fetal anomalies and pregnancy complications."[7] Furthermore, The National Institute of Clinical Excellence guideline on antenatal care in the United Kingdom recommends that all women should be offered an 18-20 week fetal anomaly scan.[8] The fetal anomaly scan is offered between 18 to 22weeks of gestation depending on the facility offering scan. The best time to do fetal anomaly scan is between 20-22 weeks as this decreases need for repeat scans. The aim of this is to detect major structural anatomical abnormalities in the fetus.[8]

Antenatal care strives to maintain the best possible state of health of mother and fetus by screening for actual and potential problems and by timeously instituting the appropriate management and referral.[9] Ultrasound is a non-invasive acceptable method of antenatal screening. The ultrasound also fulfils the criteria for a good screening test as it is safe to use, requires minimum preparation from the patient, has a high sensitivity and specificity, takes only a few minutes to perform and it is cost effective.[10] The ALARA principle is adhered to in order to protect women from unnecessary radiation. This principle is a basic radiation protection concept which looks to ensure the 'as-low-as-reasonably-achievable' dose of radiation is used.[10] In this way the procedure is safer for both mother and fetus.[10] The fetal ultrasound can assist in the diagnosis of life threatening conditions such as placenta praevia, cord presentation and breech presentation. Therefore, fetal ultrasound has a vital role to play in monitoring pregnancy antenatally.

The ultrasound is the first contact women have with their baby. It provides early visual confirmation of pregnancy and some reassurance about fetal wellbeing.[11]
Although there is justification for fetal ultrasounds from a clinical perspective, for many women social reasons may be the driving force in obtaining an ultrasound. There are some women who choose to receive minimal or selected information about the fetal ultrasound as they may be fearful of the possibility of fetal anomalies being detected.[12] These women may also have a poor understanding of the purpose of the ultrasound and therefore also choose not to receive more information.[12] There is a general idea that offering a routine service implies that it is safe and worthwhile. Lack of information may also leave women with a false sense

of security. A challenge then arises as viewing a routine service in this manner could create anxiety and psychological breakdown if an abnormality is detected. Psychological sequelae following fetal anomaly detection are not well known but some have been identified and range from anxiety symptoms, depression and post-traumatic stress syndrome.[13] A Danish study looked at the psychological impact of finding out about a congenital anomaly on the parents.[14] This study found that the knowledge of the anomaly negatively impacted on the pregnancy and that more research was required.[14]

1.3 Patient Expectations

1.3.1 Background

The majority of literature on pregnant women's expectations, has been obtained from developed countries. The increased availability of ultrasound machines has led to an increased frequency of antenatal scans for 'social' rather than clinical indications. Similarly, the widespread use of ultrasound monitoring is increasingly available in developing countries. Due to the birth of the "social scan", widespread use of ultrasound monitoring is becoming available especially in developing countries.[3] In 2014, ultrasound usage in the United states averaged 5.2scans per pregnancy. An increase of 92% from 2004.[15]

1.3.2 Perspective from developed countries

Women in developed countries generally have good knowledge and understanding of the antenatal ultrasound examination. Two similar studies were performed by Eurenius et al (1997) and Villeneuve et al (1998), both in developed countries. They found that expectations of pregnant women tend to be realistic, reasonable, and clinically relevant.[16, 17]

A study done in Denmark looking at routine second trimester ultrasounds showed high relationship between low social class and lower educational level.[18] For these women their expectations of the procedure were more likely to be determination of fetal sex and obtaining an ultrasound picture of their baby.[18] More educated women were more likely to be concerned about the wellbeing of the fetus and the presence of abnormalities.[18]
Woman attending routine scans versus high risk scans also yielded different expectations. Fears were generally greater in the women with higher education as they understood the risk of fetal anomaly detection.[16, 17, 18]

In 2015, a study was undertaken in Norway which aimed at gaining a deeper understanding of pregnant women's expectations.[19] They found three main outcomes. In the first outcome, women wanted to know if everything was okay with baby.[19] The second outcome focused on the women's need for emotional bonding with the fetus and looked at a desire to view the unborn child.[19] The third outcome looked at holistic care where women described a need for a merging of clinical as well as psychological care during pregnancy and bonding with the partner.[19] In comparison to previous studies done, there was a strong desire to know medical knowledge about fetal health in this study. The scan provided a personification of and an attachment to the fetus.[19]

Studies comparing the expectations of primigravida and multigravida women have also been performed. Outcomes measured include expectation of obtaining a clear photo, being less worried about fetal health, confirming fetal heath and being more or less attached to the baby after the scan. There were no significant differences found between the groups.[20]

A study which researched why women wanted prenatal ultrasound, found that many women did not know that the ultrasound in pregnancy is a screen for fetal anomalies.[21, 22, 23] These women cited non-medical reasons for desiring ultrasound, including determining sex of baby and seeing baby.[21]

Equipping women with knowledge is important prior to doing a fetal ultrasound. Many women obtain information from pamphlets, internet sources but mostly from the doctors attending to them.[24] Some studies have shown a deficit in knowledge of the women regarding the reason for request for scan.[21, 22] In the studies which showed women had good knowledge, it was noted that information was supplemented by friends and family and that improving information and access to it, increased knowledge of purpose of fetal ultrasounds.[22, 23]

In a study done in Sweden, one third of women could not recall being told that the scan could detect fetal anomalies.[25] Another Swedish study also found that although information was given prior to ultrasound being done, 17% of women still thought purpose of scan was to detect sex of baby.[26]

Pregnancy is associated with increased stress and anxiety.[27] Studies have also confirmed that antenatal ultrasounds can have psychological sequelae.[27, 28] It is therefore important to remember that performing an ultrasound can provoke added anxiety, especially on a woman

who has not anticipated potentially receiving news regarding the potential presence of a fetal anomaly.[26, 27] This highlights the need to provide appropriate counselling and education prior to the scan.

1.3.3 An African perspective

In Africa more studies are being done on the topic of fetal ultrasound. Studies have been published from South Africa, Botswana, Nigeria and Tanzania which have yielded a variety of different results. These differences could be attributed to differences in social and cultural beliefs.

In Cape Town, South Africa, a study was conducted to identify the expectations of women attending fetal anomaly ultrasound.[29] Data was obtained before and after ultrasound. There was a close association between prior knowledge of fetal ultrasound and whether their expectations were met.[29] Most women had good knowledge and were happy with their experience.[29] The study found that many of the woman felt less anxious after ultrasound as they were reassured by seeing the baby and being reassured by the sound of the fetal heartbeat.[29]

In the study done in Botswana most women did not know what the ultrasound procedure encompassed.[30] Despite this many were willing to participate in the ultrasound monitoring as they believed it may improve their health.[30] The women, who were unwilling, based their decision on cultural beliefs.[30] They believed that a woman should not be able to look into her womb. The study was conducted in a rural setting and this may be the reason for women's lack of knowledge. [30]

A qualitative study done in Tanzania also highlighted the poor knowledge of woman regarding ultrasounds.[31] Many women overestimated the diagnostic power of the ultrasound.[31] There was a great amount of fear that the ultrasound scan may cause harm to either mother or fetus.[31] However, many women enjoyed the actual ultrasound experience and said it would increase their attendance at antenatal care. [31]

A Turkish and Saudi Arabian study both yielded similar findings regarding knowledge and expectations of fetal ultrasounds.[32, 33] The women were found to have insufficient to moderately insufficient knowledge regarding use of ultrasound, with a high degree of

misinformation regarding women's expectations. There was a great need for national education in terms of the diagnostic capabilities and limitations of pregnancy ultrasound.[32, 33]

A Nigerian study looked at attitudes of antenatal women toward sonography in pregnancy.[34] The most common reason for desiring a scan was to view the fetus.[34] They found the women to have good a good attitude towards fetal ultrasound scans.[34] Level of education and occupation influenced their views.[34] Many of the women had a higher education level and had knowledge of reproductive health.[34] It is however difficult to generalise these findings to the entire population as the study was done in a tertiary hospital and the study population only included urban women who could access antenatal care.[34]

1.4 Conclusion

With the advent of 'social' ultrasound, the indications for scan are not always clinical. Patient expectations will differ depending on the education level and prior knowledge of the mother. Unhappiness or anxiety may be caused if expectations are not met. Unmet expectations may increase the likelihood of litigation following an adverse outcome or detection of a fetal anomaly.

2 AIMS OF STUDY

2.1 Aims

The population attending Rahima Moosa Hospital come from a rich diversity of cultures and different social backgrounds. Over twenty clinics refer their pregnant women to the hospital. The fetal ultrasound has been offered at the hospital since the hospital doors first opened. Over 1300 ultrasounds are done per annum. At Rahima Moosa Hospital there is also a high percentage of pregnant women that are non-South Africans.

Van Gelderen et al, in a review of ultrasound, ethics and the law stated that: ”research is required to assess the expectations of pregnant women in regions such as our own South Africa, and whether they are satisfied with what they receive.”[35]
Although only one study of this nature was done in Cape Town, Bricker et al, recommended that comparative research on ways in which pregnancy ultrasound is carried out and experienced in different countries and cultures would be valuable.[36] This study will attempt to look at expectations and knowledge prior to fetal ultrasound at Rahima Moosa Mother and Child Hospital.

2.2 Problem statement

Women have expectations, prior knowledge and beliefs surrounding fetal ultrasounds. Unmet expectations may lead to a negative experience of pregnancy. Unmet expectations or unrealistic expectations are often a source of medical litigation. Most studies of women in developed countries found them to have good knowledge and appropriate expectations prior to a fetal ultrasound. The question is whether the expectations of our population are similar to global trends? Do our women receive any information about antenatal ultrasound scans? This study will attempt to determine the expectations and knowledge of our population to improve positive pregnancy experiences regarding fetal ultrasound.

2.3 Objectives of this study

- To determine women's expectations of the fetal ultrasound.
- To determine knowledge of fetal ultrasounds.
- To evaluate if the woman's expectations are in line with fetal ultrasound offered.
- To establish our populations view on the importance and necessity of fetal ultrasound in antenatal care.

3 METHODOLOGY

3.1. Study design

This was a descriptive study performed during September 2016. A questionnaire was piloted in August 2016 on 25 women at Rahima Moosa Mother and Child Hospital and adjustments were made to improve clarity where necessary.

3.2 Study setting

Rahima Moosa Mother and Child Hospital is a regional level hospital located in Coronationville, Johannesburg. The hospital provides Obstetric and Gynaecological services and caters to the surrounding areas. It is the referral hospital for clinics and district hospitals in the western Johannesburg region. Women seen in antenatal clinic are referred to the ultrasound department for second trimester fetal anomaly scan or dating scans where gestational age is unsure.

3.3 Study Population

The study population consisted of women presenting to the ultrasound department for routine and fetal anomaly scans. The following inclusion and exclusion criteria were used:

3.3.1 Inclusion criteria

- Women over the age of 18 years
- Pregnant women between 18 and 22 weeks of gestation for those attending fetal anomaly scans or
- Pregnant women at any gestation for routine ultrasound
- Women who had given consent
- English speaking women

3.3.2 Exclusion criteria

- Women who were unwilling to participate in the study
- Women with known fetal anomalies
- Anyone who did not speak English

3.4 Literature Review

The literature search was conducted via Pubmed using the key words: expectations, knowledge, fetal ultrasound. Relevant references were accessed if available via the University of the Witwatersrand eJournal portal. Appropriate articles cited by other authors were also reviewed. Appropriate websites were also used and referenced

3.5 Data collection

Women awaiting ultrasound at the ultrasound department and antenatal clinic were invited to participate in study. Women who met the criteria were recruited to participate in the study. Verbal and written consent were obtained prior to questionnaire being administered (Appendix B). Participants were told verbally about study and an information sheet was also given for further reading regarding study.

An interview style questionnaire was then administered in a demarcated area in both the ultrasound department and antenatal clinic which would allow for confidentiality to be maintained. Participants answered questions about their demographics. Quantitative and qualitative questions were asked about the women's knowledge and expectations of fetal ultrasound. A data sheet was used to collect data and data was also entered onto the REDCap programme. (AppendixA).

3.6 Data Analysis

Qualitative and quantitative data were collected. Data was also captured electronically on the REDCap data collection programme. Variables were then exported to Microsoft Excel spreadsheet. Stata 14.1 was used to generate the statistical analysis.

Patient knowledge and expectations were compared within the various education and parity groups. Comparisons were also between women who did not have prior ultrasounds with those who did.

Descriptive data was tabulated and analysed for differences between baseline characteristics. Descriptive statistics were employed by using means with standard deviations and medians with ranges. Frequencies were expressed in percentages with 95% confidence intervals. Comparisons of frequencies were made using Chi-squared test. Frequency distributions were

compared using Student's t-test for parametric data and the Mann-Whitney test for non-parametric data. Statistical significance was indicated by a p-value of <0.05**.**

3.7 Ethics approval

Approval for study was given by the Human Research Ethics Committee of the University of Witwatersrand (Appendix C). Permission was granted from the Chief Executive Officer at Rahima Moosa Mother and Child Hospital to conduct study at this site (Appendix D).

3.8 Funding

Any costs incurred were borne by the researcher. Women were not rewarded for participating in the study.

4 RESULTS

4.1 Characteristics of study population

A total of 261 women were interviewed in the study. Eleven women. were excluded from the study due to difficulties with communication. A total of 250 of women were included for statistical analysis.

Figure 4.1.1 to figure 4.1.8, gives the social and demographic characteristics of participants. Majority of women where aged between 26 and 35 years. Two hundred and two women were black of which 22% were from Zimbabwe. Forty four women were primigravid. A mean gestational age of 23 weeks was found at the time of interview.

The majority of participants, a total of 180 women , attended secondary schooling, although only 59 women continued beyond secondary schooling level. Eleven women had a primary school level of education.

One hundred and six women were unemployed. Eighteen percent of women were single. A hundred and twenty two women did not plan this pregnancy and all women booked for pregnancy. Eighty eight women had not had a previous fetal ultrasound in this pregnancy and the majority of women in the group where referred for a routine ultrasound.

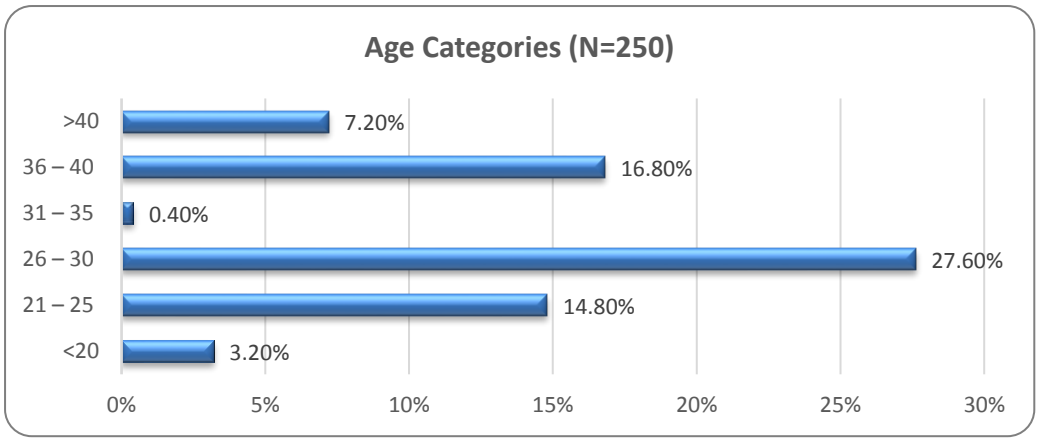


Figure 4.1.1 Age of women

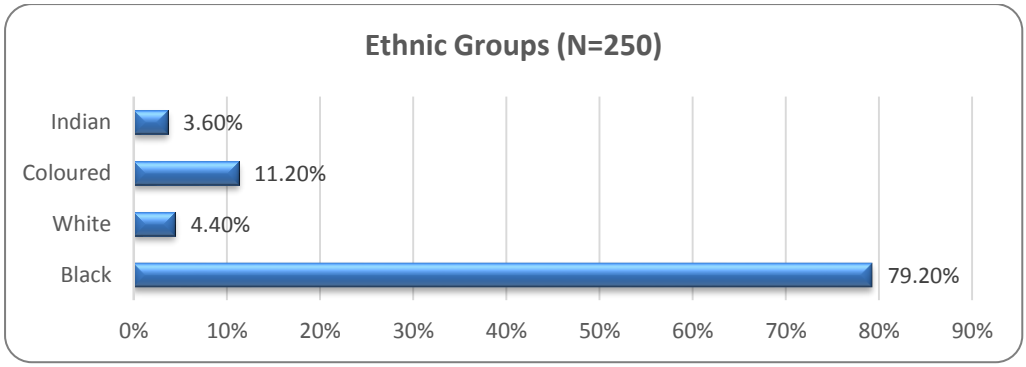


Figure 4.1.2 Ethnic groups of women

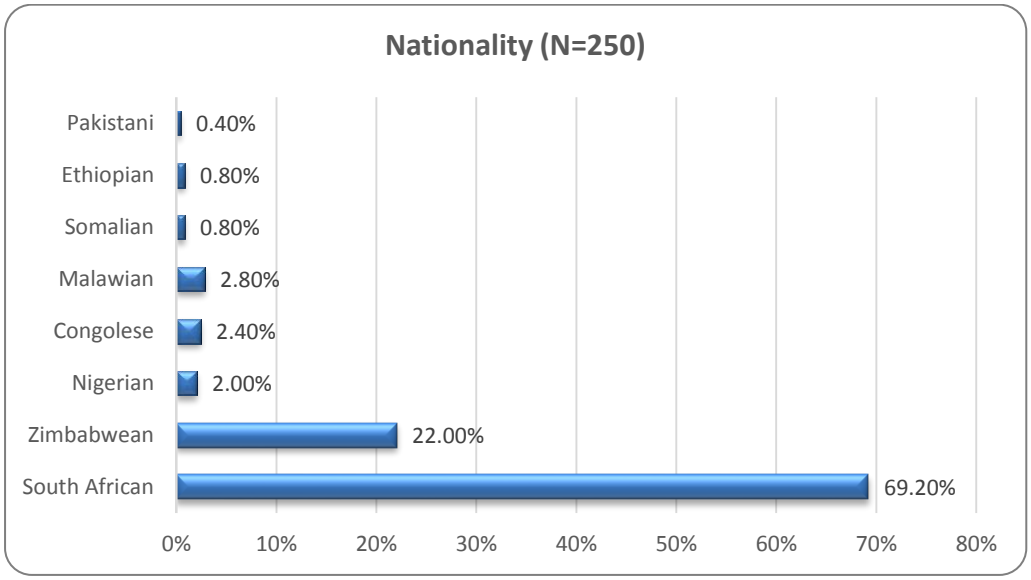


Figure 4.1.3 Nationality of women

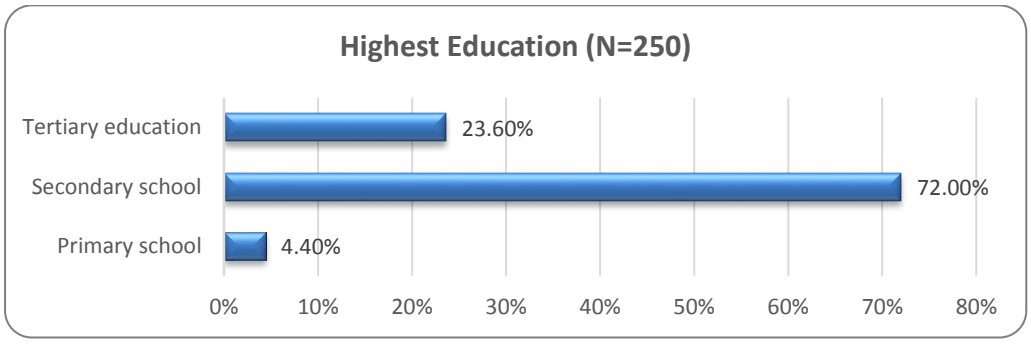


Figure 4.1.4 Education level of women

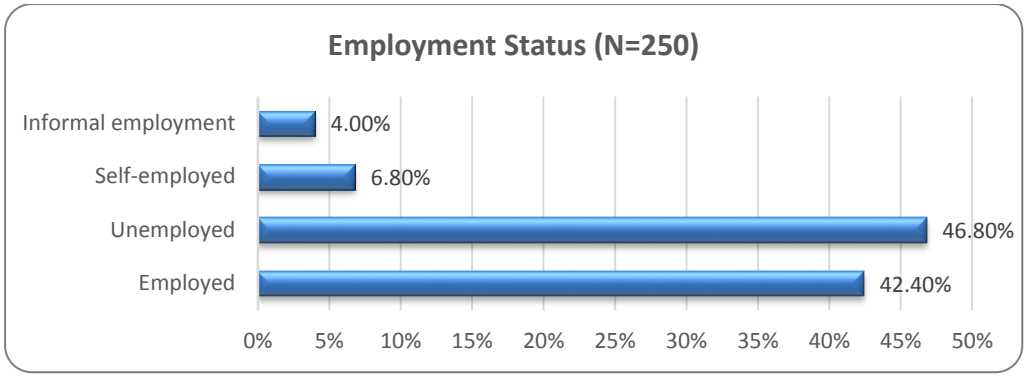


Figure 4.1.5 Employment status of women

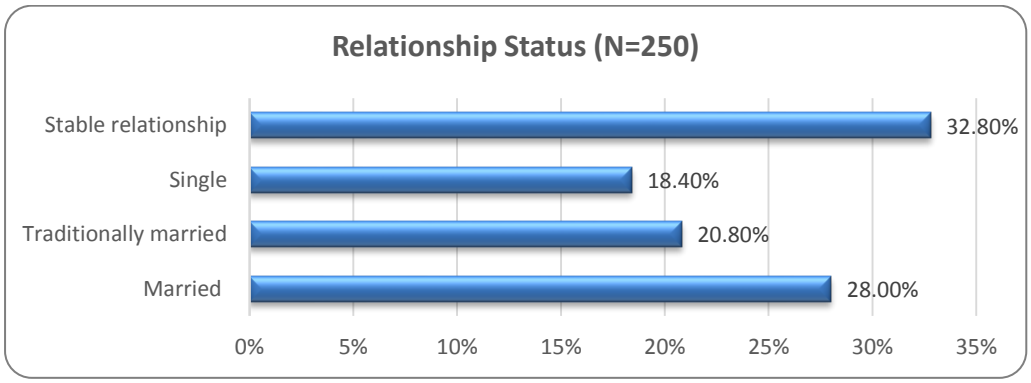


Figure 4.1.6 Relationship status of women

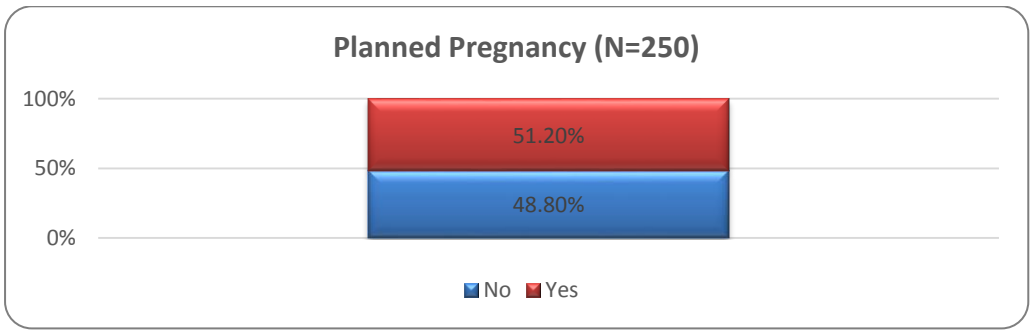


Figure 4.1.7 Planned pregnancy

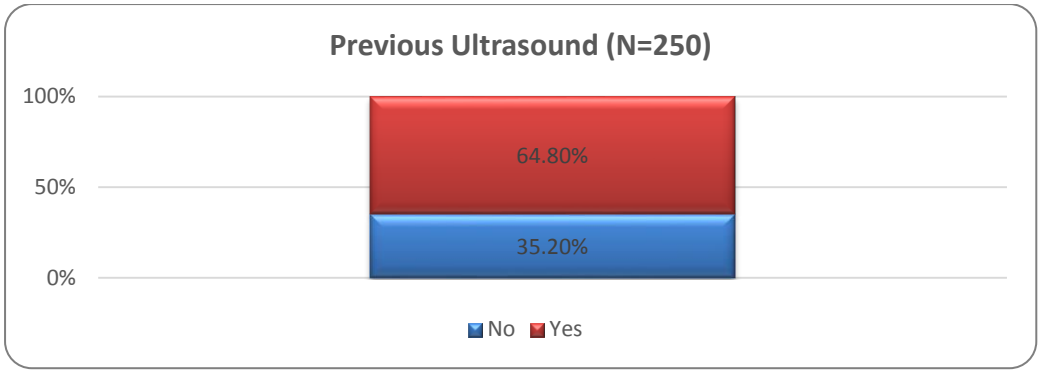


Figure 4.1.8 Previous ultrasound in this pregnancy

4.2 Patient expectations of fetal ultrasound

Figure 4.2.1 to 4.2.2 shows a summary of women's expectations where the patient had and had not previously had an ultrasound. In the majority of both groups the expectations were similar except for the presence of fetal anomalies and 'to see the baby'. The expectation that was expressed most frequently was to know the sex of baby. In both groups 63% of women wanted to know the sex. Of significance, seventy three women (83%) with no previous ultrasound and a hundred and fifty two women (93.8%) who had a previous ultrasound in this pregnancy had an expectation to see unborn baby. All women expressed a form of expectation prior to ultrasound.

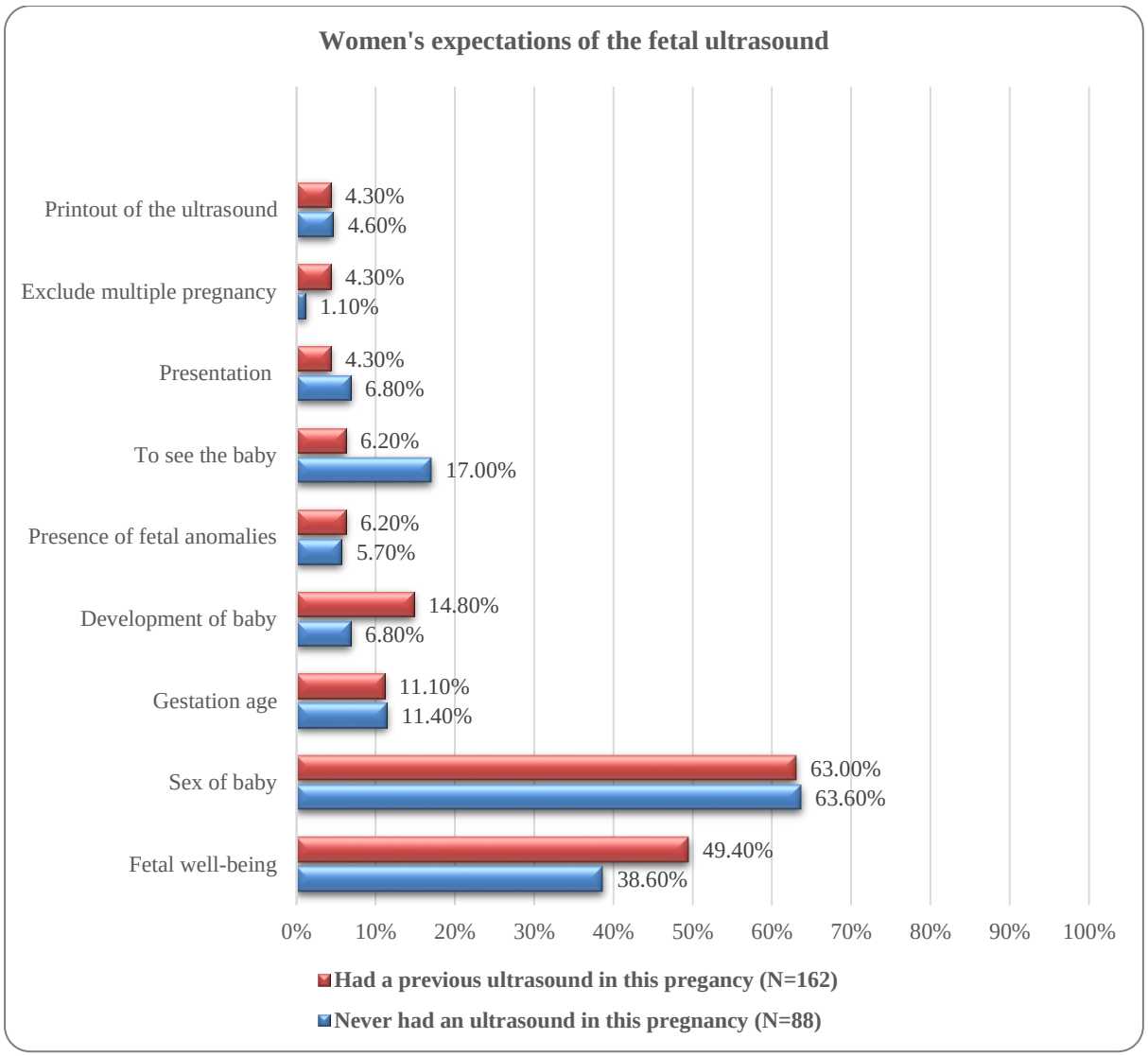


Figure 4.2.1Womens expectations of fetal ultrasound

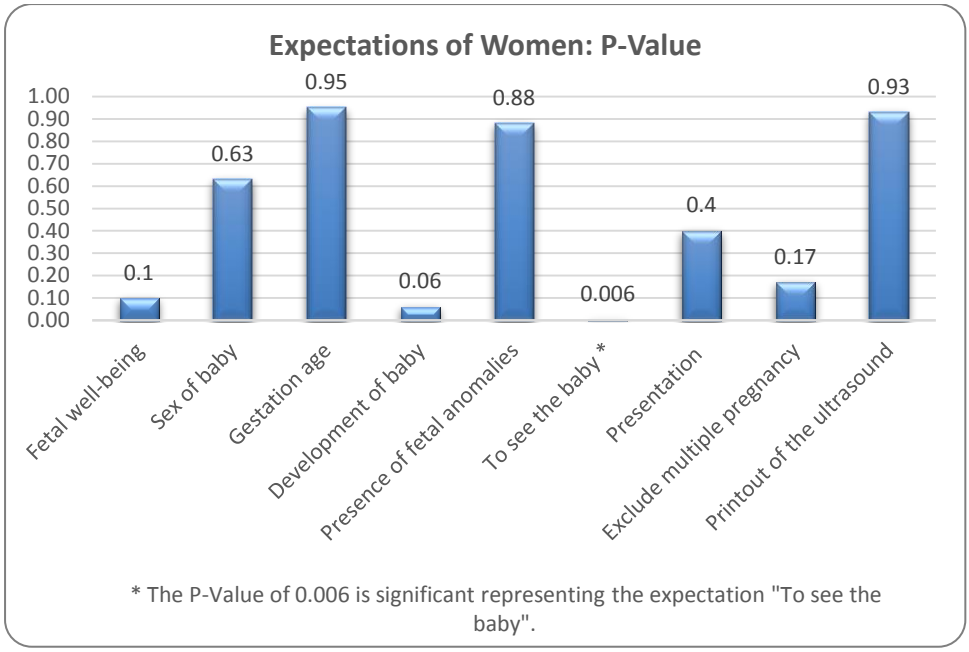


Figure 4.2.2 P values of expectations of women

4.3 Women's feelings regarding ultrasound

Figure4.3.1 to 4.3.2 gives a summary of patient feelings or emotions prior to fetal ultrasound. The majority of women were happy (n=144). One patient had no feelings about the ultrasound. A smaller group of women were nervous (n=28) and anxious (n=21).

Most women felt positive prior to ultrasound as they were welcoming of the ultrasound experience. There were no significant findings with these associations.

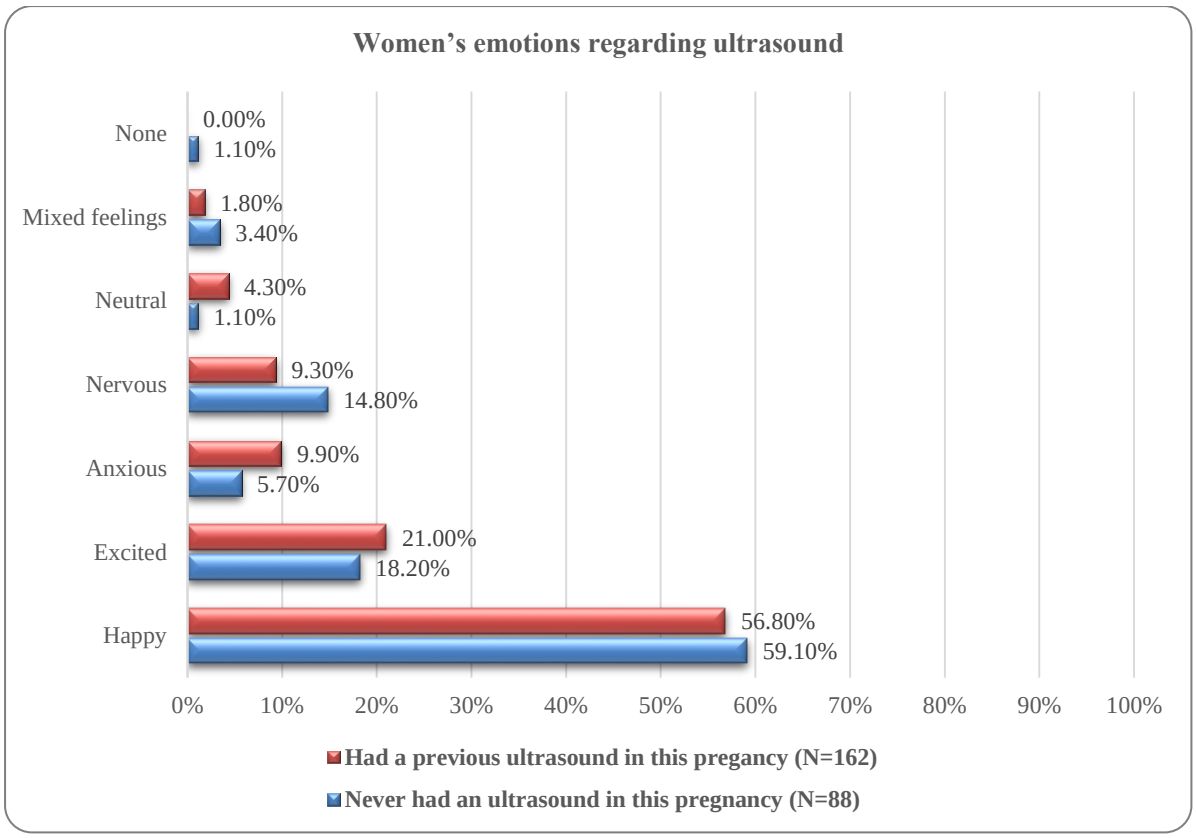


Figure 4.3.1 Women's emotions regarding ultrasound

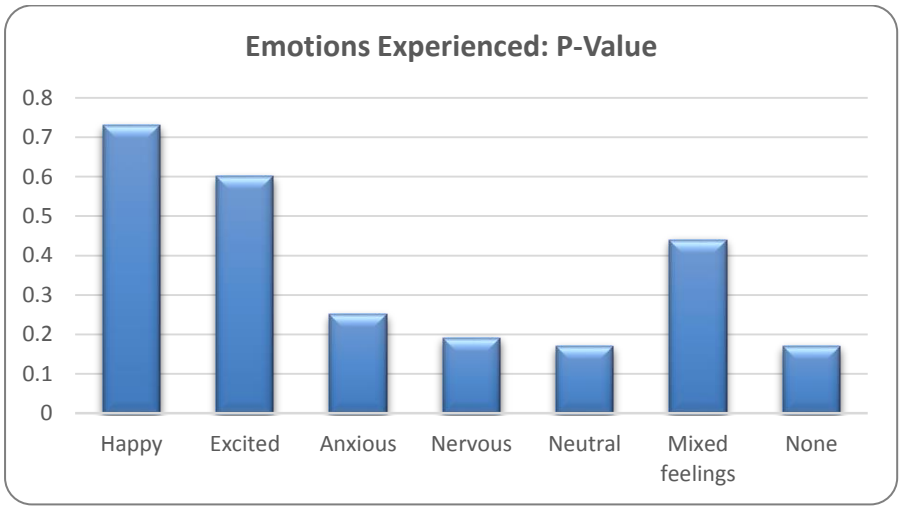


Figure 4.3.2 P-values of emotions experienced

4.4 Patient source of Information of fetal ultrasound

Figure 4.1 shows a graph depicting the source of patient information. The majority of information was obtained from healthcare workers (80.4%) including staff from local clinics, antenatal clinics and private doctors. The internet was a large source of information (22.6%) compared to the newspaper (0.4%) which was a poor source of information about fetal ultrasound. Friends were seen to be a source of information (11.2%) and women with previous pregnancies (26%) gained information from their past experience.

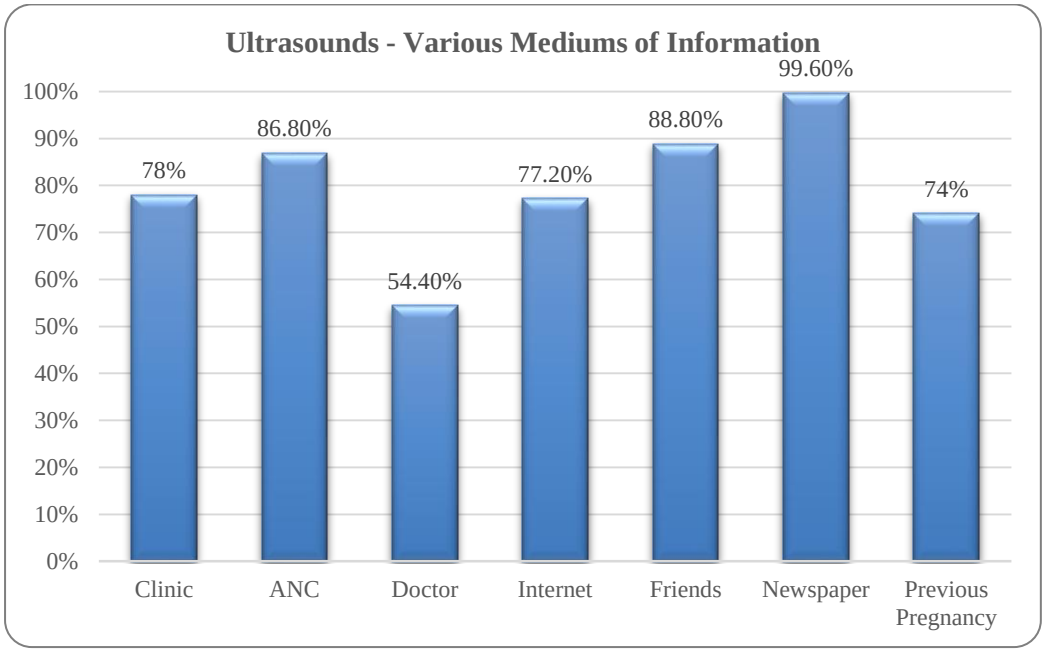


Figure 4.1: Source of information regarding scans

4.5 Women's Concerns prior to ultrasound

Figure 4.5.1 to 4.5.2 summarises patient concerns about fetal ultrasounds and compares whether or not women had prior fetal ultrasounds. The results were generally similar in each group. The greatest concern being the determination of baby's sex followed by gestation calculation. The group of women who did not have a prior ultrasound where less concerned about the presence of fetal anomalies.

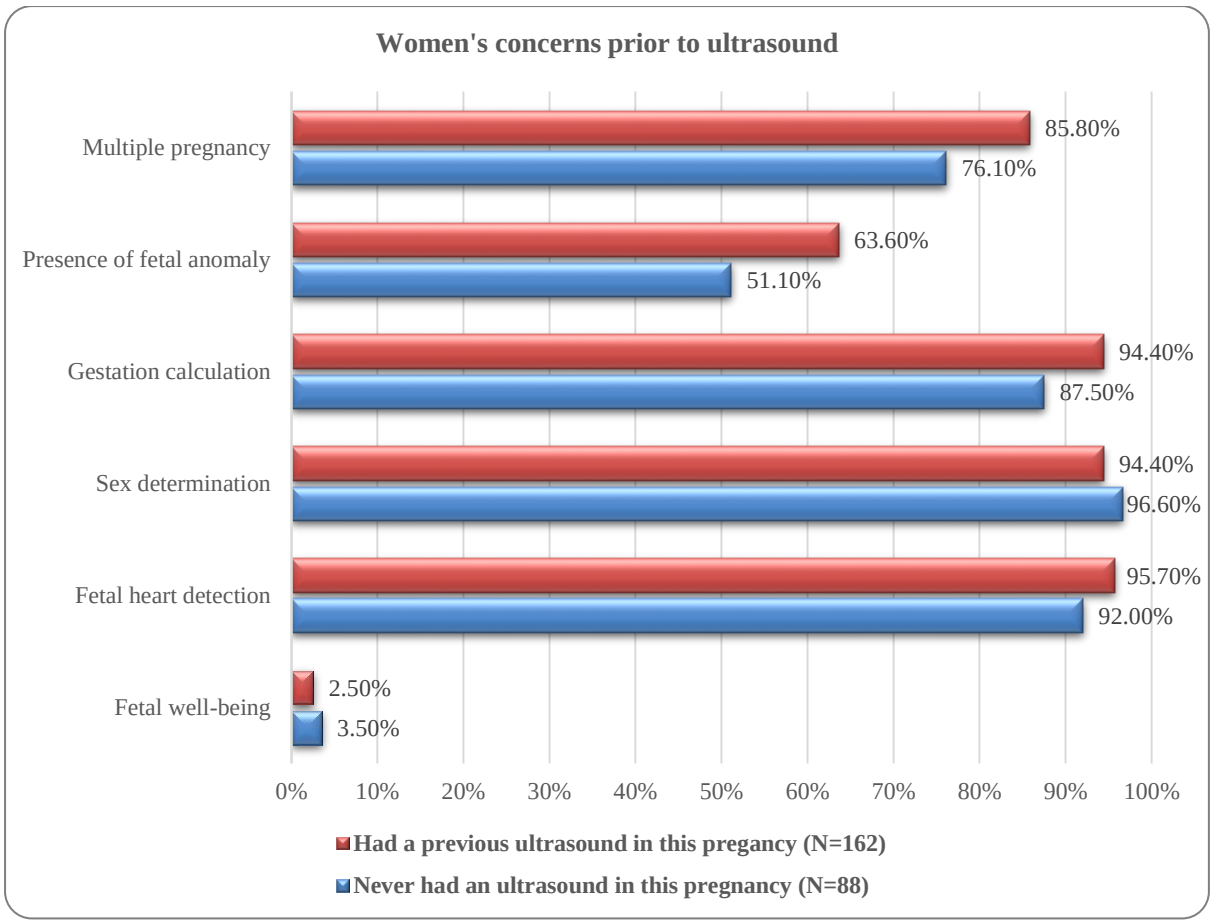


Figure 4.5.1 Women's concerns prior to fetal ultrasound

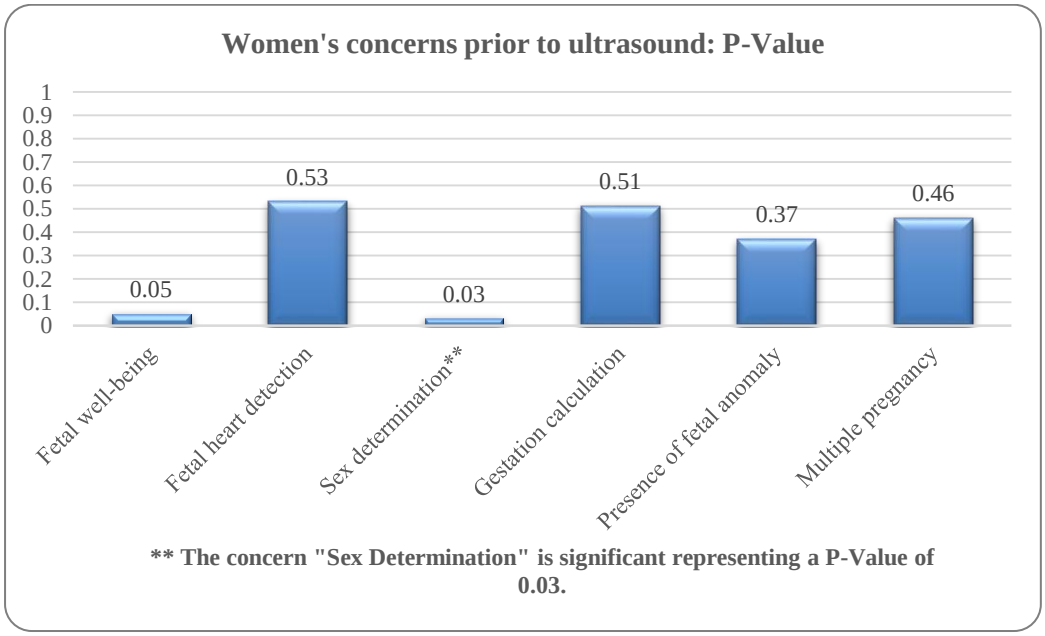


Figure 4.5.2 P-value of women's concerns prior to fetal ultrasound

4.6 Women's knowledge and perception of fetal ultrasound

Figure 4.6.1 to 4.6.4 summarises patient perception and knowledge of fetal ultrasounds. Comparisons where made between women who previously had ultrasounds with those who had not.

The accuracy, purpose and indication for the fetal ultrasounds where found to be the same in both groups. Most women felt the ultrasound was inaccurate, including the added reasons that were given for an inaccurate scan. Some women were unsure 8% and 43% felt the ultrasound was 100% accurate. Over half the women knew the purpose and indication of the ultrasound.

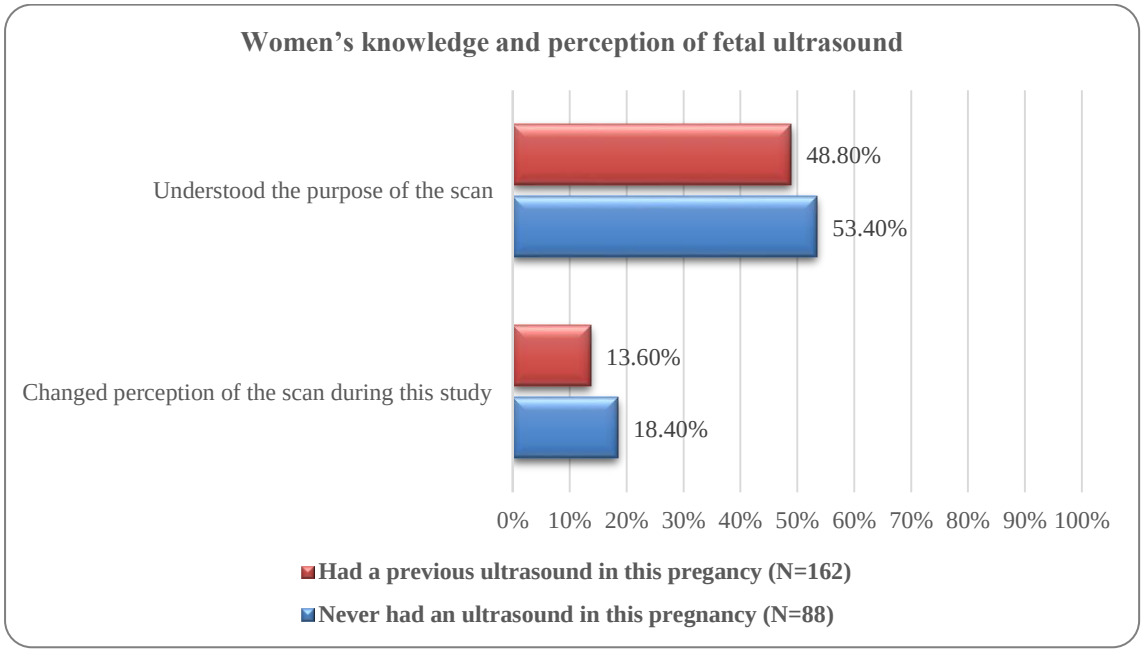


Figure 4.6.1 Women's knowledge and perception of fetal ultrasound

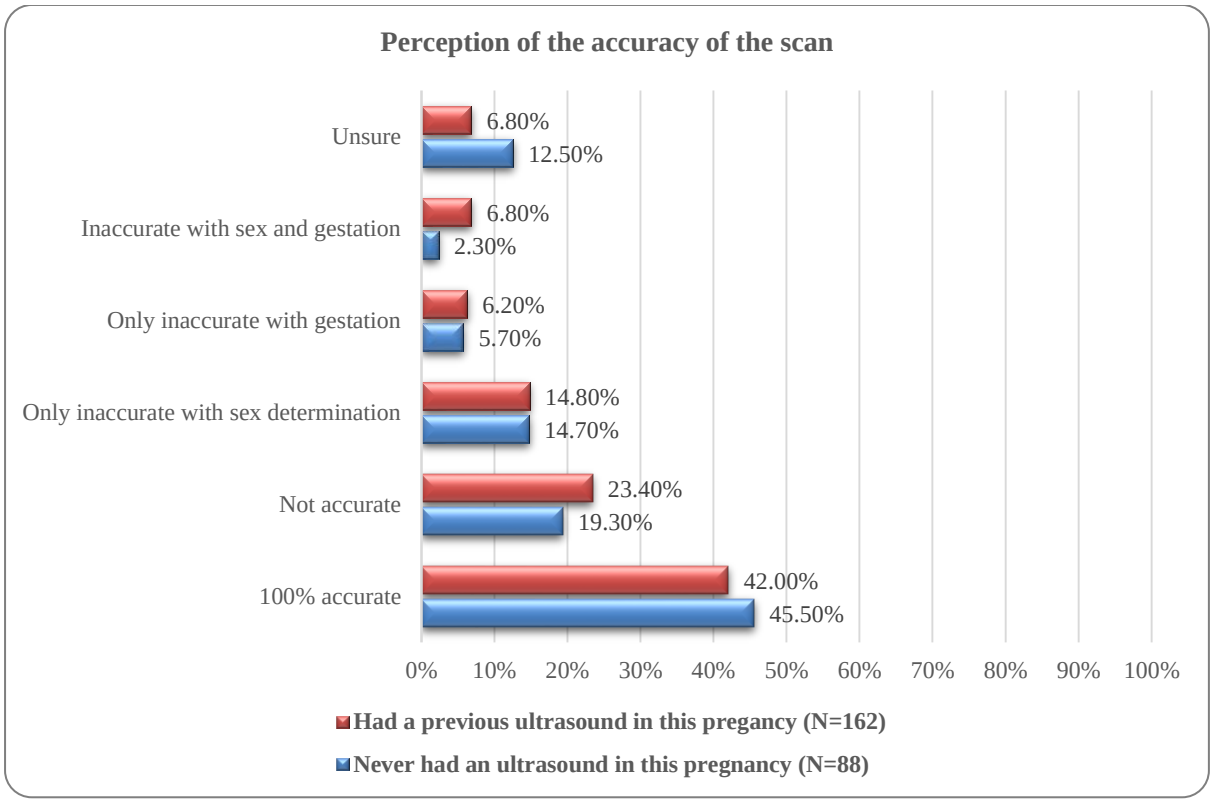


Figure 4.6.2 Perception of accuracy of scan

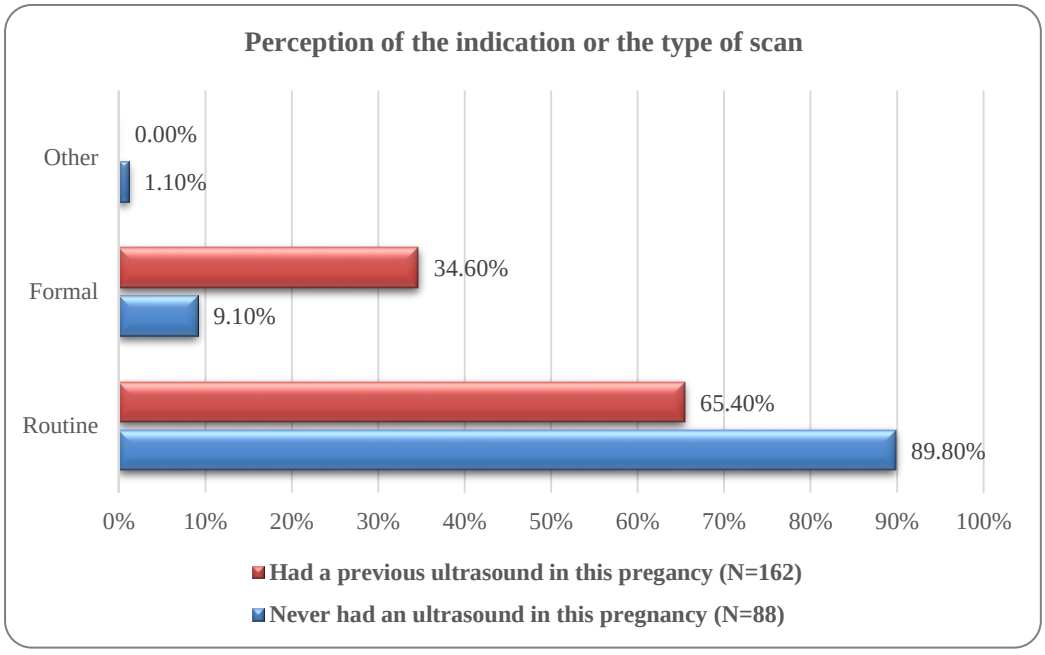


Figure 4.6.3 Perception of the indication or the type of scan

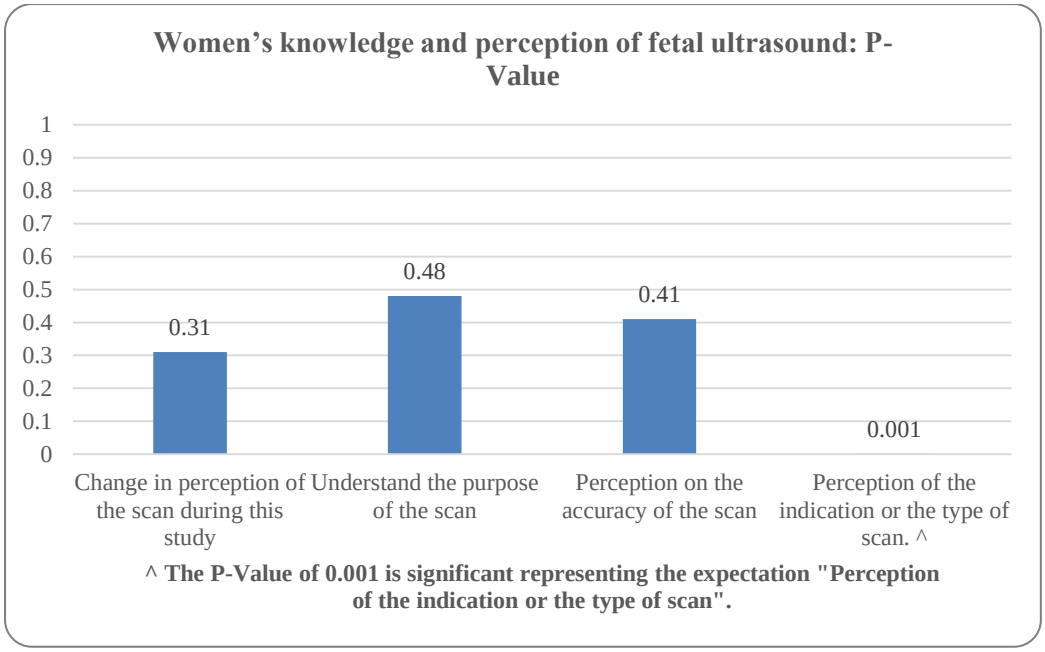


Figure 4.6.4 P-value of women's knowledge and perception of fetal ultrasound

4.7 Women's Perceptions according to parity

Figure 4.7.1 to 4.7.2 summarises the patient expectations by parity.

The results were similar across the different parity groups. The majority of women had an expectation of finding out baby's sex, followed by fetal wellbeing across the groups.

Most women did not expect to find fetal anomalies across the parity groups.

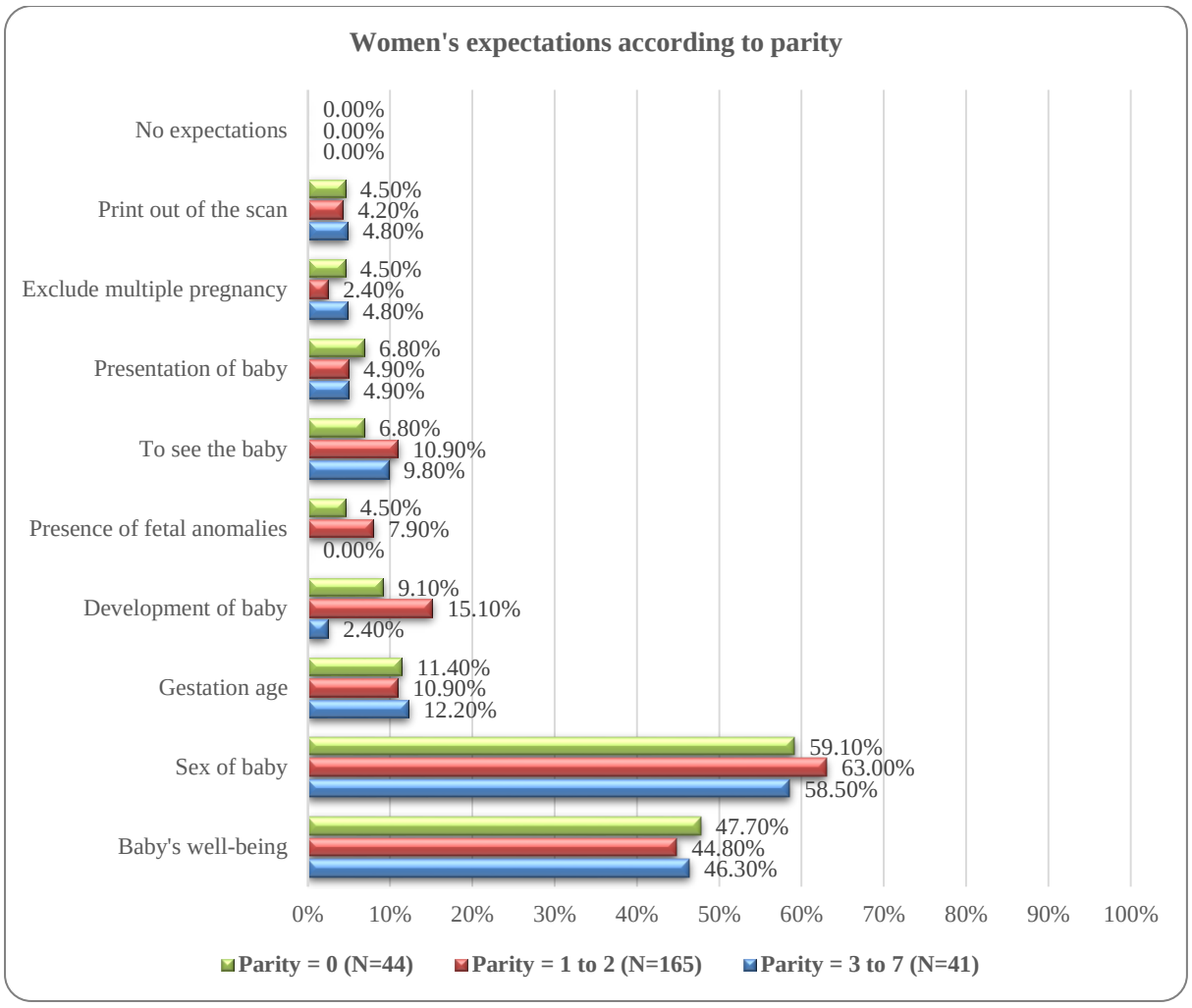


Figure 4.7.1 Women's expectation according to parity

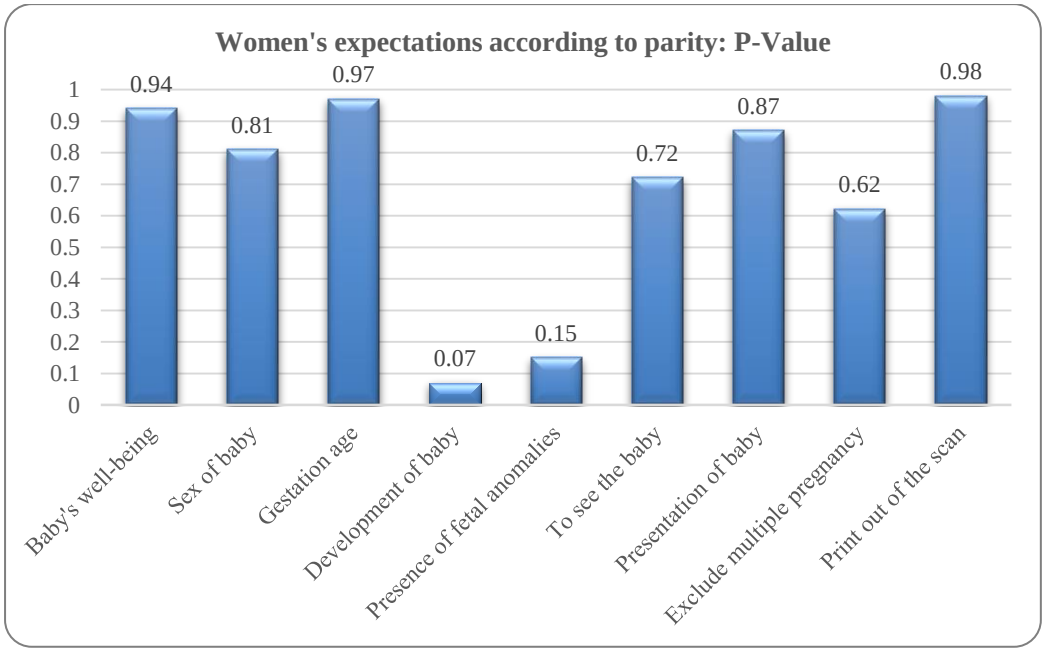


Figure 4.7.2 P-value of women's expectations according to parity

4.8 Women's education level

Figure 4.8.1 to 4.8.2 summarises the patient expectations and knowledge from scan by education.

The majority of women had education from secondary schooling (n=180). Eleven women had primary school level education and 59 women had tertiary education. The lower the level of education, the lower the level of knowledge could be seen. Of statistical relevance, across the levels of education, most of the women did not know that the fetal ultrasound could detect fetal anomalies (p= 0.003[xx]). All the women with primary schooling did not know fetal ultrasound could detect fetal anomalies (100%). Ninety six percent of women with secondary education and 84.8% of women with tertiary education were ignorant to fetal anomaly detection by fetal ultrasound.

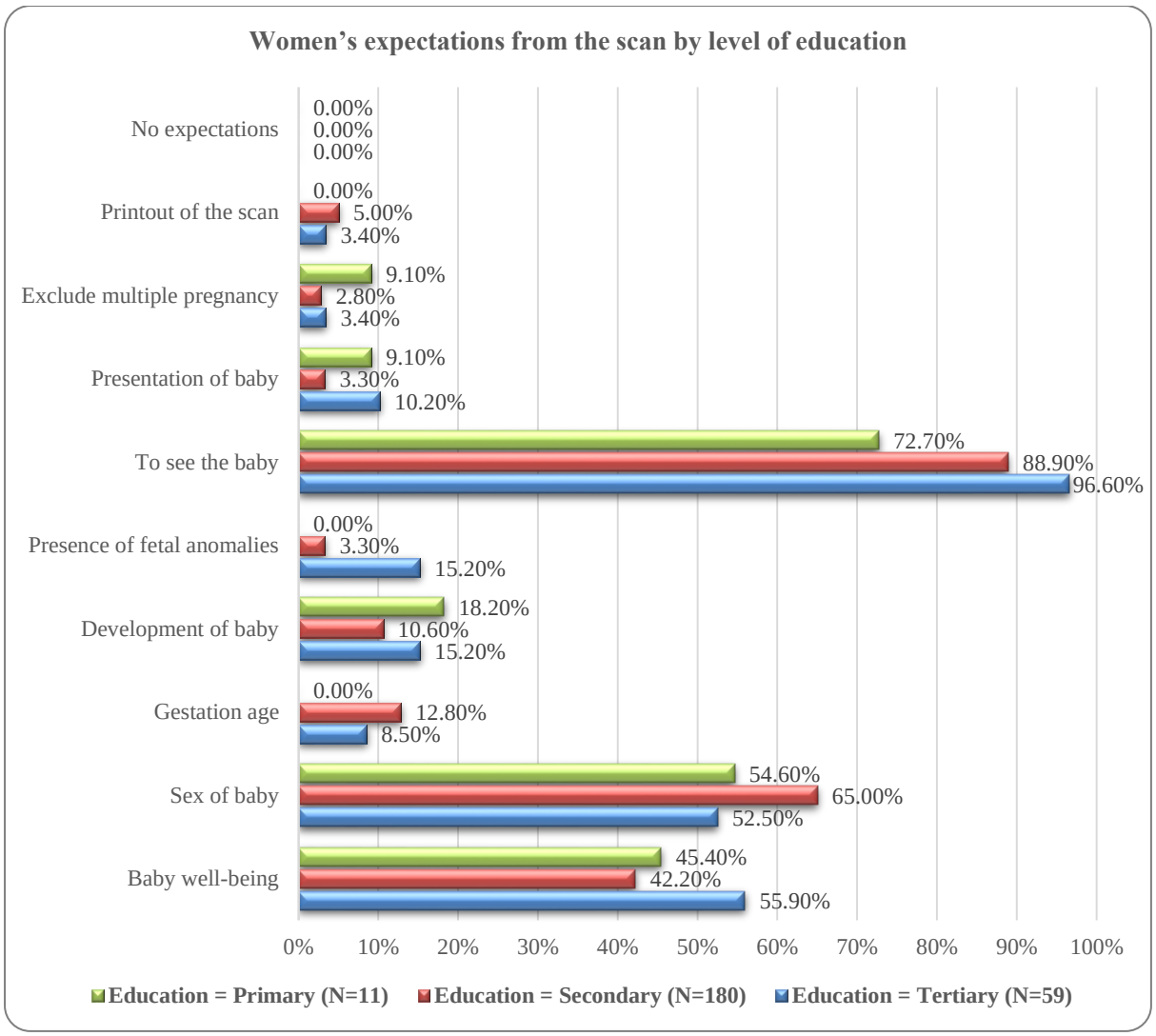


Figure 4.8.1 Women's expectations by level of education

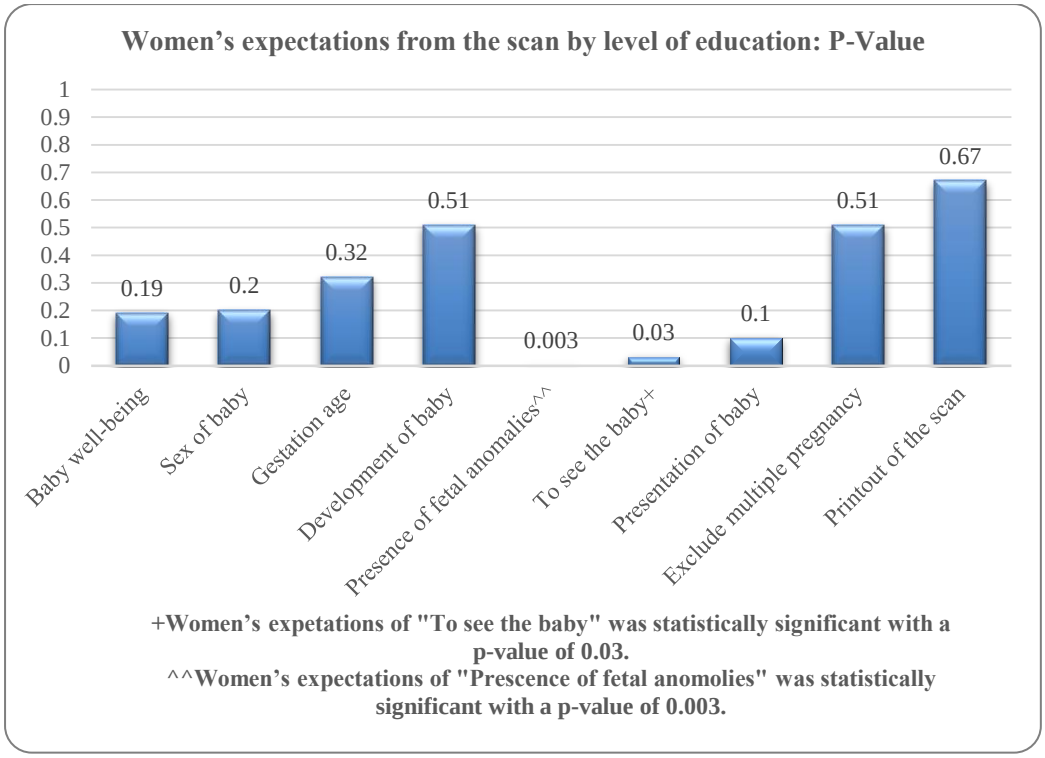


Figure 4.8.2 P-value of women's expectation by education level

5 DISCUSSION

5.1 The expectations of women from a fetal ultrasound.

In this study, the most common expectation was the sex of the baby with 96.6% of women. This is very different to studies in developed countries where the majority of women (85%) expected to know the well-being of their baby and the presence of fetal anomalies.[16, 17] Most of the studies from the UK and Denmark noted this to be the case.[18] They found that these women had good knowledge of ultrasound and prior counseling. The women also tended to be from higher socioeconomic circumstances.[16, 17, 18]

The findings from our study are more in keeping with studies from developing countries. In Botswana and many of the other developing countries the most common expectation of women was to know the sex of the baby.[30] Determining the sex of a baby is not a routine part of the fetal ultrasound and if international guidelines are followed, it is not one of the important reasons for doing a fetal ultrasound. Questions have been raised as to why this expectation has been found to be the highest in women in lower socioeconomic groups in both developed countries as well as the small number of studies from developing countries. This may be due to cultural factors. The importance of a male baby that will grow to be a provider and breadwinner for the family or a child who will continue the family name.[37] In African culture there is great important in producing a first born son.[37] In the Nigerian study, the disclosure of the sex of the baby was guarded as women tended to opt for termination of the pregnancy if a fetus of the undesired sex was found.[34] In China there is great emphasis on male children as there was a one child policy for many years.[38] In India boys are more important as they are a source of income to families.[39] Knowing the sex of the baby may be a very important part of preparing for the arrival of an additional dependant and this is seen with many studies in both developed and developing contexts.[16, 17, 32, 33]

The women attending at Rahima Moosa Hospital are predominantly from low socioeconomic backgrounds. The great importance of determining the baby's sex in this study is then in keeping with previous studies. Despite the education level of the women in the study, the expectation to find out the sex of the baby was still the greatest. The expectation to determine if fetal anomalies were present, which is the main focus of the obstetrician, was very low. It appears that with the emergence of the 'social' scan, the importance and clinical relevance of ultrasounds may be lost in translation.

In this study the second most common expectation was to determine the well-being of the baby. Despite the similarity between this study and the other African studies, studies in Botswana, Turkey and Saudi Arabia found the second highest expectation was to get a picture print out.[32, 33] In this study only 10% of women wanted a print out. The most surprising finding of this study was the very low number of women who expected to find out about anomalies of the fetus. This is most likely a factor of poor knowledge and understanding of the ultrasound process. It also indicates that very little information is given by doctors to women prior to referring them to ultrasound.[21, 22, 23]

5.2 Women's knowledge of the fetal ultrasound.

All women had some level of education although the majority were at the secondary school level. Most women obtained their knowledge of fetal ultrasounds from health care workers. As the knowledge obtained from healthcare workers comprised 80.4% of the source of knowledge. The quality of knowledge and the counselling given by health care workers in antenatal clinic regarding ultrasound is questionable.

The majority of women were able to identify the top four important findings of a fetal ultrasound.

The top four fetal findings where:

1. Fetal heart detection
2. Sex determination
3. Gestation determination
4. Presence of abnormality

Notably 94% of women did not know the fetal ultrasound could detect fetal anomalies across education levels.

Studies from developed countries have found women to have appropriate knowledge.[16, 17] The study in Sweden did attribute women having good and appropriate knowledge to having good access to knowledge such as pamphlets, internet use and counselling prior to fetal ultrasound.[25]

In this study women did not have access to pamphlets and 0.4% still got information from newspapers. Many women still relied on friends and family as a source of knowledge and this information may be incorrect and possibly false. Further questions in questionnaire to ascertain patient knowledge of ultrasound looked at patient understanding of accuracy of ultrasound, purpose and safety.

More than a third of the women based the accuracy of the ultrasound with its ability to accurately determine, sex of baby and correct gestation. Most women felt the ultrasound was safe and this may be linked once more to the role the social scan has played in creating a possible false sense of security in the intention and purpose of fetal ultrasounds above those of lack of education. This was seen in this study were a resounding 94% of women did not know fetal anomalies could be detected and yet the others aspects of knowledge were generally adequate.

The majority of women had knowledge prior to fetal ultrasound from the various sources previously stated. A Swedish study found women did not recall information given prior to ultrasound either because they forgot or due to the anxiety of the ultrasound.[26] Perhaps the women in this study were unable to recall information related to certain important aspects of the fetal ultrasound such as the ability to detect fetal anomalies.

5.3 Women's expectations of fetal ultrasound offered and our population's view on the importance and necessity of fetal ultrasound in antenatal care.

In this study most of the women had appropriate expectations and knowledge. Although the expectation to determine fetal sex was the highest expectation, the expectations to follow were reasonable. To determine fetal wellbeing, development as well as to determine if baby is alive were the next expectations.

The expectations compared to studies from developed countries were different. In developed countries women had appropriate expectations.[16, 17] In this study the expectations were in keeping with the findings from the study done in Denmark, where women where mainly concerned with knowing fetal sex.[18] The small African studies were also in keeping with this study as the expectations were similar and also showed lack of insight or knowledge as fetal sex determination was the most important expectation.[29, 30, 31, 32, 33]

Expectations were also not different with primigravida versus multigravida women. Other studies noted that multigravida women had appropriate expectations compared to primigravida women.[20] This may be due to women in the developed countries receiving more information and counselling prior to fetal ultrasound.

The study population comprised a rich diversity of ethnicities and nationalities. All the women felt that fetal ultrasounds were important. There reasons were mainly to know if the baby was safe and well. Other more unique reasons where to know if the baby was albino and to see the colour of baby's eyes.

For many of the women, English was not their first language and although they felt the scan was important, they may not have expressed their reason for the importance for ultrasound well enough. These findings were in keeping with the few studies done in developing countries as the women in these studies also saw value in ultrasounds.[32, 33]

6 LIMITATIONS

This study focused on women over the age of 18 years old. Important information may have been missed by excluding pregnant women less than 18 years. Only booked women were interviewed as only booked women were referred for ultrasounds.

The findings from this study must be interpreted with caution because of potential selection and recall bias. Women may have given answers which they feel are socially acceptable skewing some of the results.

English was not the home language of the majority of the women interviewed. This may have led to difficulties in communication and understanding of the interview questions, therefore resulting in the incorrect interpretation of information obtained from participants.

Women with known fetal anomalies were excluded from the study. Including these women may have yielded valuable information regarding knowledge and expectations. However, as these women were already aware of a possible fetal abnormality, it would have resulted in biased data.

Although the desired number of participants was reached, a number of women chose not to participate in the study. A different sample population may have resulted in different outcomes.

7 RECOMMENDATIONS

All women referred to ultrasound should be educated on the purpose and safety profile of ultrasound. Education by nursing staff/posters/pamphlets on ultrasound and the reasons for ultrasound can take place during the antenatal care of patient. The nurses in the clinics and antenatal clinics may also include educational teaching about the fetal ultrasound in waiting areas of the clinics. Further studies still need to be conducted in our setting and country to determine the expectations and knowledge of women.

8 CONCLUSION

The fetal ultrasound plays an integral part in the care of pregnant women. Clinically, the ultrasound can guide health care workers in identifying factors which may harm mother or baby and on a psychological level women are reassured of fetal wellbeing. The majority of women in this study did not have appropriate knowledge or expectations of fetal ultrasounds. In this study, the most important expectation was a desire to know fetal sex. Women received knowledge from various sources with the largest contribution coming from heath care workers. Despite this 94% of women did not know that the fetal ultrasound could detect fetal anomalies.

The knowledge given to women antenatally needs to be addressed and an improvement made in the information provided in the form of pamphlets or posters needs to be given.

It is important that heath care workers are mindful that women have their own expectations and understanding of ultrasound. They need to be given the correct information by health care workers regarding ultrasound use. Social reasons for ultrasound should not be dismissed but corrected in line with what is appropriate for maternal and fetal care.

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APPENDIX A

Data sheet

Date

Study number

Participants' information

1. Age ……..
2. Where do you live …….
3. Ethnic group

Black 1	White 2	Coloured 3	Indian 4	Other 5

Specify

……

4. Gestation (best estimate)
5. Parity
6. Highest education received

Primary school 1	Secondary school 2	Higher education 3	Tertiary Education 4	Other 5

Specify

……

7. Employment

Employed 1	Unemployed 2	Self-employed 3	Informal employment 4	Other 5

Specify

……..

8. Relationship

Married 1	Traditionally married 2	Single 3	Stable relationship 4

9. Pregnancy planned

Yes 1	No 2

10. Booked

Yes 1	No 2

11. Have you had a previous scan?

Yes 1	No 2

If yes when and why …….....

12. What are your expectations from this scan?

.....
.....
.....
.....

13. What are your feelings about the scan?

.....
.....
.....
.....

14. Where did you get your information regarding scans from?

.....
.....
.....
.....

15. What do you think is the purpose of scans in pregancy?

.....
.....
.....
.....

16. Regarding the scan, do you have any concerns relating to yours or babies health?

.....
.....
.....
.....

17. Do you know the following concerning the scan?

- Fetal heart detection (baby is alive)

Yes 1	No 2

- Sex determination (boy or girl)

Yes 1	No 2

- Gestation calculation (how many months pregnant)

Yes 1	No 2

- Presence of abnormality (baby not normal)

Yes 1	No 2

- Presence of multiple pregnancy (more than one baby)

Yes 1	No 2

18. Have these questions changed your ideas about the scan?
    .....
    .....
    .....
    .....
19. How accurate do you think is the scan you just had? If no why?.....
    .....
    .....
    .....
    .
20. What was the type of scan or indication?
    .....
    .....
    .....
    .....
21. Do you know or understand the purpose of your scan today?
    ……
    ……
    ……
    ……

APPENDIX B

Information leaflet and Informed consent

Good day, my name is Dr Eularnia Bok. I am a doctor training to be a specialist in obstetrics and gynaecology here at Rahima Moosa Mother and Child Hospital. I am conducting research in order to obtain a master's degree (MMed). My research looks at pregnant patient's expectations prior to fetal ultrasound and whether the expectations are in line with the ultrasound service being offered.

The findings will help understand current knowledge of ultrasound monitoring in pregnancy, expectations of ultrasounds testing and the effect of the experience on pregnancy. I hope the information gained may assist improvement of knowledge of ultrasound monitoring and help resolve unmet expectations to allow for a positive pregnancy experience. I plan to ask all women awaiting routine and fetal anomaly scans at the ultrasound department at Rahima Moosa Mother and Child Hospital.

I invite you to participate in my research. All I require is information regarding your background and questions relating to your expectations of the fetal ultrasound. I will not perform any examinations or tests on you. I assure you that your personal information will be kept highly confidential. Only your study number will appear on the forms which will be kept by me and my supervisor Professor Lombaard. Your file number will not appear on my research. The data sheet will not contain any identifiable information and will be destroyed once data analysed.

You will not receive any remuneration or reward for participating in study. You may change your mind at any point even if you have signed. Your treatment and care shall not be jeopardized in any way if you decide not to participate in my study. Ethics approval has been obtained from the University of Witwatersrand and the Human Research Ethics Committee.

You may contact me at any time concerning my research. My cell number is 0723812662.

Human Research Ethics Committee contact details:

Prof P Cleaton Jones, Tel 011 717 2301, email: peter.cleaton-jones1@wits.ac.za

Ms Z Ndlovu/ Mr Rhulani Mkansi/ Mr Lebo Moeng at the Administrative Officers Tel: 011 717 2700/ 2656/ 1234 /1252 email: zanele.ndlovu@wits.ac.za; Rhulani.mkansi@wits.ac.za; and Lebo.moeng@wits.ac.za

If you are willing to participate in my study, please kindly sign that you have understood all that has been explained to you.

Thank you for your participation.

Participant ……..

Witness ……..

Researcher……...

Date ……....

APPENDIX C

R14/49 Dr Eularnia Bok

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M1604103

NAME: (Principal Investigator)	Dr Eularnia Bok
DEPARTMENT:	Obstetrics and Gynaecology Rahima Moosa Mother and Child Hospital
PROJECT TITLE:	Expetations of Pregnant Patients Prior to Fetal Ultrasound
DATE CONSIDERED:	06/05/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Hendrik Lombaard
APPROVED BY:	Professor P. Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	18/07/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004,10th floor, Senate House/2nd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated,from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review in April and will therefore be due in the month April each year.

Principal Investigator Signature

Date 18/07/16

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX D

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

RAHIMA MOOSA MOTHER AND CHILD HOSPITAL

Enquiries : Dr Edward Hank
Tel : (011) 470 9030/1
Fax : (011) 477 4117
Email : Edward.Hank@gauteng.gov.za

Department of Obstetrics and Gynaecology
University of the Witwatersrand

Dear Dr. Bok

RE: EXPECTATIONS OF PREGNANT PATIENTS PRIOR TO FETAL ULTRASOUND

Permission is granted for you to conduct the research as indicated in the title above.

The terms under which this permission is granted is contained in the Researcher Declaration form that you have signed. Failure to comply with these conditions will result in the withdrawal of such permission.

It is crucial for you to inform the Research Coordinator, Karen Marshall of the actual start and end dates of your study. This could be done by e-mail.

Should the study commence more than 12 months after receipt of this approval letter you will have to go through the process of applying again.

You are strongly advised to keep a signed copy of the declaration form so as to ensure that the terms of this agreement are complied with at all times.

Yours sincerely,

GAUTENG ADMINISTRASIE
RAHIMA MOOSA HOSPITAL
PRIVAATSAK / PRIVATE BAG
02 FEB 2016
NEWCLARE GAUTENG
RAHIMA MOOSA HOSPITAL
GAUTENG ADMINISTRATION

DR EDWARD HANK
Clinical Manager
2016:02:02

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