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Social Support among Pregnant Adolescent and Young Adults during Prenatal Ultrasound Study in A Single Tertiary Level Hospital

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Abstract

Introduction: Prenatal care and support is essential to improving birth outcomes for teen pregnancy. Pregnant teens and young adults have access to a variety of support people. The study evaluated the identity of personal social support of pregnant adolescents and young adults (AYA) during prenatal ultrasound study.

Methods: We conducted a descriptive retrospective observational study from a tertiary OBGYN referral center from August 2010 to April 2013; participants were pregnant women 21 years of age or younger referred for ultrasound study. The main outcome measure was documentation of social support person(s) accompanying the patient.

Results: A total of 517 patients with an age range of 13 to 21 (mean 17.75) underwent 1,058 ultrasound studies. The father of the baby was the most frequent person accompanying the patient (33.4%), followed by the patient's mother (25.2%). Age was significantly associated with type of support person, with older AYA more likely to present with the father of the baby. Finding an abnormality on ultrasound did not result in increased follow-up or a change in support person.

Discussion: The majority of adolescents and young adults will show to an ultrasound study accompanied by one or more individuals as social support. Patient's age is the strongest variable affecting who will be the social support person.

Keywords: Adolescent health; Preconception care; Patient education; Pregnancy

Introduction

Teen birth rates in the United States have declined almost continuously since the early 1990s, largely due to the widespread use of contraception. Nevertheless, the teen birth rate in the United States is higher than that of many developed countries, and the social and economic consequences of teen pregnancy remain significant [1-4]. Adolescents and young adults (AYA) who experience pregnancy are less likely to finish high school, more likely to rely on public assistance, and more likely to be incarcerated [4]. Additionally, the estimated cost of teen pregnancy to American taxpayers is about. About 4 billion dollars per year in lost productivity, tax revenue, and medical costs [5]. Furthermore, AYA who become pregnant are at risk for numerous health-related complications, including low birth weight infants, preterm labor and delivery, and postpartum depression [6].

Lack of prenatal care in adolescents significantly increases the risk of preterm delivery and low birth weight (LBW) infants independently of the risk associated with their age [7,8] Teens are less likely to seek prenatal care for a variety of reasons, including fear of repercussions, the presence of an undesired pregnancy, or lack of access to appropriate resources [7,9].

Pregnant teens and young adults have access to a number of support systems, including family, friends, partner and institutional sources, e.g. school, church [10]. Increased social support during pregnancy has been shown to be associated with improved birth outcomes. A recent study from our own institution supports this view by noting that pregnant AYA experienced improved birth outcomes, as measured by length of gestation and birth weight, when the father of the baby (FOB) was present at the patient's first ultrasound study appointment [11,12]. Prenatal ultrasound study appointment is a standardized procedure with definable results and is an experience in pregnancy during which the pregnant mother may want to bring support person(s). Even though it has been shown that social support during teen pregnancy improves outcomes, very little research has been done to delineate the types of support that teens have access to during their ultrasound study while pregnant.

In this study, we sought to elucidate the differences among pregnant adolescent patients in terms of who they brought to their ultrasound study appointments based upon their age, the trimester in which they first presented for prenatal care and compliance with follow-up ultrasound study. In addition, we noted whether there has been a

change in social support once fetal or maternal problems were identified. The purpose of this study was to evaluate the identity of personal social support of pregnant adolescents and young adults during prenatal ultrasound study.

Methods

This is a retrospective observational study from a tertiary OBGYN referral center. The computerized archiving and reporting system of the Fetal Imaging Unit at University Hospitals Cleveland, Ohio, over a period of 30 months from August 2010 to April 2013, was searched using maternal age between 12 to 21 years to identify pregnant AYA patients. Approval for this retrospective chart review study was obtained from the Institutional Review Board (IRB) of University Hospitals Cleveland Medical Center.

Patients included in the study were all seen at a single tertiary academic medical center in Cleveland, Ohio. Data collected included gestational age at each ultrasound study visit, support person(s) present, sonographic detection of definitive fetal anomalies and abnormalities related to fetal growth, amniotic fluid volume, placental disorders, and uterine, cervical and ovarian abnormalities.

Ultrasound studies included studies in any trimester, biophysical profile studies, and limited studies in which only the cervical length was checked. The ultrasound studies were performed by Maternal-Fetal Medicine trained physicians. The studies were performed in accordance with guidelines published by the American Institute of Ultrasound in Medicine (AIUM) for studies in the first, second, and third trimesters.

For inclusion in this study, the requirements were: singleton pregnancy with maternal age between 12 and 21, attendance at one or more ultrasound appointments, known gestational age at the time of appointment either by a known last menstrual period (LMP) and/or confirmed by an ultrasound study, documented presence and identity of a support person(s) at these visits, availability of complete ultrasound reports, and delivery records.

Cases of intra-uterine fetal death or early trimester miscarriage (n=22), ultrasound study prior to elective abortion (n=9), and cases accompanied by female prison guard [13] were excluded. Cases in which the patient presented with both the father of the baby and other individuals, with the mother of the patient and other individuals, or both the father of the baby and the patient's mother or father, were classified into the group of "more than one support person" in some but not all statistical calculations, tables and figures. Foster family members and social workers were included in the "other" group of social support.

Subgroup analysis by AYA age groups was conducted in order to analyze the relationship between maternal age and social support. Potentially confounding factors (such as insurance status, income, education, etc.) were not included as the available stored data in the ultrasound unit does not include such data.

Data Analysis

To answer the first research question, "is there an association between different support types and a patient's age at the first ultrasound visit", we employed a Kruskal-Wallis test, due to the violation of normal assumption between age group and support type (Shapiro Wilk's Test $p<0.0001$). Following this, depending on statistical significance of the Kruskal-Wallis test, post-hoc Mann Whitney U tests are performed on each support pair with a Bonferroni correction ($\alpha=0.05/7=0.007$) to determine where the statistically significant differences may lie.

To answer "is there an association between the patient's gestational age (according to trimester) at first ultrasound and who accompanies her"; we conducted a chi-square test of association due to the nominal nature of both natures.

We performed a chi-square test to determine whether there was a change in the support type that the patient from first to second appointment depending on detection of fetal anomaly.

We employed a Kruskal-Wallis test (due to violation of normal assumption-Shapiro Wilk's Test $p<0.0001$) to answer the question, "what is the association between type of support a patient brings at first appointment and gestational age (in weeks) at delivery?" Following this, depending on statistical significance of the Kruskal-Wallis test, post-hoc Mann Whitney U tests are performed on each support pair with a Bonferroni correction ($\alpha=0.05/7=0.007$) to determine where the statistically significant differences may lie.

Finally, we performed a multinomial logistic regression to determine which variables of interest-patient age, trimester of first appointment, number of visits, fetal anomaly in first ultrasound, and known LMP-were associated with the odds of type of support at first appointment.

Results

A total of 517 patients met the inclusion criteria and underwent 1,058 ultrasound studies. Of these, 62 patients (12%) had only a single ultrasound visit, 169 (32.7%) had 2 studies, 152 (29.4%) had 3 studies and 134 (25.9%) patients had 4 or more studies. 352 (68%) patients were pregnant for the first time; for 113 (21.7%) this was the second pregnancy, and 52 (10.3%) had been pregnant three times or more. Maternal age ranged between 13 and 21, with a mean and median age of 17.75 and 18.0 respectively, and a standard deviation of 1.56 years.

Table 1 details the identity and nature of the relationship to the patient of the support person(s) present during the ultrasound study. The father of the baby most often accompanied the patient (33.4%), followed by the patient's mother (25.2%). The father of the pregnant patient (0.7%) and either parent of the father of the baby were the least likely to be present. The father of the male partner (father of the baby) was never present (Table 1).

Support Type	Number of all visits	Percentage of all visits
Biological father of the baby	353	33.40%
Mother of the patient	267	25.20%
Patient only	183	17.30%
Family members other than parents	163	15.40%
Friends (Males and Females)	59	5.40%
Other	26	2.50%
Father of the patient	7	0.70%

Table 1: Support person(s) accompanying the patient on any one of the 1,058 ultrasound studies.

Table 2 shows median patient age differences between support types and accompanying Bonferroni-corrected Mann Whitney U Tests. The Kruskal Wallis test indicated statistically significant difference between patient age and support type at first appointment χ^2=52.49, p<0.0001). Because α=0.007, the statistically significant differences in patient age and support type were among FOB *vs.* mother of patient (p<0.0001), mother of patient versus other support type (p<0.0001), FOB versus more than one support type (p<0.0001), mother of patient versus more than one support type (p=0.005), and mother of patient *vs.* alone (p<0.0001) (Table 2).

Comparison	Median Age Difference	Z-Score	Mann-Whitney U	p-value[a]
Alone *vs.* Fob[b] (n=190)	-1.00 year	-1.82	3847	0.07
Fob *vs.* Mother of patient (n=192)	2.00 years	-6.55	2136.5	<0.0001
Mother of patient *vs.* Other (n=219)	-1.00 year	-3.52	4271.5	<0.0001
Other *vs.* More than one support type (n=232)	0 years	-0.6	6387	0.54
Alone *vs.* More than one support type (n=199)	0 years	-2.41	3969	0.02
Fob *vs.* More than one support type (n=205)	1.00 year	-4.2	3508.5	<0.0001
Mother of patient *vs.* More than one support type (n=201)	-1.00 year	-2.78	3902.5	0.005
Mother of patient *vs.* Alone (n=186)	-1.00 year	-4.93	2545	<0.0001

Table 2: Kruskal Wallis mean age differences and Mann Whitney U tests between patient age and support type at first appointment (n=516) [[a]Bonferonni-corrected α=0.007; [b]FOB=Father of baby].

The chi-square test of association between gestational age at first ultrasound and support type indicated no statistically significant difference in gestational age and type of support (χ^2=8.74, p=0.07). Of those in the first trimester, 24.14% were accompanied by the FOB. This is higher than 16.18% of those in the second/third trimester who were accompanied by the FOB. Of those in the first trimester, 27.35% were accompanied by another person, compared to only 18.39% in the second/third trimester.

The chi-square test of association between detection of fetal anomaly at first ultrasound and a change in support type at second appointment found no statistically significant difference (χ^2=0.01, p=0.92). About the same amount that had a problem detected (40.43%) changed their support type as those who did not have a problem detected (41.18%).

The Kruskal-Wallis Test of difference in mean ranks between support type at first appointment and gestational age in weeks at delivery indicated no statistically significant difference (χ^2=2.66, df=3, p=0.45). Therefore, no accompanying Bonferroni-corrected Mann-Whitney U tests was employed.

The multinomial logistic regression modeling the odds of support type at first appointment according to variables of interest is reported in Table 3. Overall, patient's age had the only statistically significant association with increased odds of support type (p<0.0001), although number of visits for Other versus Alone was also statistically significant (p=0.03). Older patients had 2.05 times the odds of having the FOB at the first ultrasound than their mother (95%CI=1.63-2.57, p<0.0001) (Table 3).

Variables	β	SE	OR (95% CI)	p-value
Outcome: FOB[a] *vs.* Alone				
1st Trimester *vs.* 2nd/3rd trimester first visit	0.19	0.2	1.47 (0.75-2.91)	0.27
Knows LMP at first visit	0.24	0.2	1.61 (0.87-2.99)	0.13
Fetal anomaly at first ultrasound	0.1	0.2	1.21 (0.55-2.69)	0.64
Patient age	0.15	0.1	1.16 (0.92-1.46)	0.21
Number of visits	-0.1	0.2	0.89 (0.65-1.22)	0.47
Outcome: Mother of patient *vs.* alone				
1st Trimester *vs.* 2nd/3rd Trimester first visit	0.16	0.2	1.37 (0.67-2.81)	0.39
Knows LMP at first visit	0.15	0.2	1.36 (0.72-2.57)	0.35
Fetal anomaly at first ultrasound	-0.3	0.2	0.59 (0.28-1.24)	0.16

Patient age	-0.6	0.1	0.57 (0.46-0.70)	<0.0001
Number of visits	-0.1	0.2	0.95 (0.69-1.22)	0.77
Outcome: More than one support *vs.* alone				
1st Trimester *vs.* 2nd/3rd Trimester first visit	0.06	0.2	1.12 (0.57-2.19)	0.74
Knows LMP at first visit	0.01	0.2	1.01 (0.56-1.82)	0.97
Fetal anomaly at first ultrasound	-0.1	0.2	0.81 (0.39-1.65)	0.55
Patient age	-0.3	0.1	0.73 (0.60-0.90)	0.003
Number of visits	-0.3	0.2	0.76 (0.55-1.05)	0.09
Outcome: Other *vs.* Alone				
1st Trimester *vs.* 2nd/3rd Trimester first visit	-0.1	0.2	0.90 (0.47-1.75)	0.76
Knows LMP at first visit	0.1	0.2	1.22 (0.69-2.16)	0.5
Fetal anomaly at first ultrasound	-0	0.2	0.96 (0.48-1.94)	0.91
Patient age	-0.2	0.1	0.83 (0.58-1.02)	0.08
Number of visits	-0.4	0.2	0.70 (0.51-0.97)	0.03
Outcome: FOB *vs.* Mother of patient				
1st Trimester *vs.* 2nd/3rd Trimester first visit	0.03	0.2	1.07 (0.52-2.20)	0.85
Knows LMP at first visit	0.09	0.2	1.18 (0.62-2.29)	0.61
Fetal anomaly at first ultrasound	0.36	0.2	2.05 (0.94-4.49)	0.07
Patient age	0.72	0.1	2.05 (1.63-2.57)	<0.0001
Number of visits	-0.1	0.2	0.93 (0.67-1.30)	0.69

Table 3: Multinomial logistic regression modeling odds of support type at first appointment given variables of interest (n=493) [[a]FOB = Father of Baby].

Discussion

Adolescent pregnancy is a priority health issue in the Unites States due to increased economic and societal costs. Social support refers to the people or resources that an individual can turn to in times of life changes and stressors [13]. We chose ultrasound study appointments as our 'prenatal care visits' because it is a standardized procedure with definable results that allows for the presence of a support person. Our study shows that the majority of pregnant AYA (83%) come to ultrasound study accompanied by social support. The father of the baby was the most likely person to accompany the patient to an ultrasound study followed by the patient's mother. The father of the pregnant patient was present the least. No parent of the father of the baby was present.

We found a difference in support person according to patient age. When compared to patients who came with their mothers alone or with the mother and the father of the baby together, patients who presented with only the FOB were older. For younger teens, the mother is likely still the primary caregiver. Older patients may have more independence or have a developed relationship with a male partner. They may also be more likely to seek support from friends and more distant relatives once they are no longer under the care of their own parents.

We sought to identify differences in gestational age at which the first ultrasound study was conducted according to the patient's support type. While there was no statistically significant difference between groups, some trends were noted that might warrant further investigation. For example, 24% of patients who presented in the first trimester came with the father of the child as compared to 16% of patients who presented in the second or third trimesters. Additionally, 27% of patients who came with "another person" presented in the first trimester compared to 18% who presented later. This indicates the possibility that patients who come with the father of the baby or another person are more likely to present earlier when compared to other groups. This finding correlates with that already described in which older patients are more likely to come with the father of the baby or "another person." It might suggest that older teens are more inclined to seek care earlier, and they may be more likely to have specific social support. One might speculate that older patients who present with the father of the baby have desired pregnancy when compared to younger patients, and are therefore more likely to be proactive in seeking care.

Follow-up ultrasound study when ordered by the care provider is an important part of prenatal care. We questioned if patients who had abnormal finding on an ultrasound study were more likely to show to a follow-up study in comparison to AYA who were scheduled for follow-

up study to confirm normal fetal growth without confirmed abnormality. In addition, we questioned whether or not there was a change in the person serving as social support in comparison to the initial ultrasound study. After controlling for patient age and gestational age, we found that patients who had a detected fetal, uterine, or cervical anomaly on the initial ultrasound visit were no more likely to return for a second visit than patients with normal prior ultrasound study. In fact, 73% of those with detected problems returned compared to 77% of those with normal studies. Additionally, detection of an anomaly had no effect on the rate at which patients changed who they brought as their support person to the next appointment. These results are surprising for two reasons: first, we expected patients with abnormal ultrasound study findings to return for follow-up appointments at a higher rate than those with normal study; and second, we hypothesized that if these women appeared unaccompanied or with no parental presence at their first study visit, that they would bring the father of the child or a parent to the follow-up appointment. One possible explanation for this apparent dissonance is that abnormal findings on ultrasound are a deterrent to follow-up. Much like patients who are diagnosed with gestational diabetes and then fail to return for follow-up, perhaps these women fear additional bad news. Future research should focus on trying to identify which factors are most important in determining the likelihood of follow-up.

We reviewed available literature in order to compare our findings with those reported by other researchers. Unfortunately we were unable to find similar studies. Despite numerous publications detailing various findings among AYA population no study has previously sought to elucidate the differences among pregnant adolescent patients in terms of who they brought to their ultrasound study appointments based upon their age, the trimester in which they first presented for prenatal care and compliance with follow-up ultrasound study. As such we can't comment on any commonalities or lack of between our study and others.

The strength of this study is that the support person has been verbally identified directly at each visit by the care provider and did not rely on any proxy measures of support. In addition, all ultrasound studies were performed by the same physicians at a single institution allowing for greater consistency in findings. The study analyzed AYA patients in a single tertiary level medical center, our results might reflect only the local population and not necessarily the entire AYA population.

The study did not have the statistical power to study social support among Caucasian and Hispanic adolescents as the great majority of patients were African American. This study was also limited by information regarding social, education background, and family status of AYA included. The identity of the support person(s) was self-reported and not verified. Future directions should focus on further stratifying AYA into more nuanced groups to identify if there are other factors that may be playing a role in how they determine their support type, other than their age. Additionally, it will be useful to ascertain whether there is a difference in support type based upon whether or not the pregnancy was planned and/or desired, a factor that was not examined in this study.

We conclude that among the AYA population the father of the baby is the most commonly self-identified person accompanying the adolescent or young adult pregnant patient to an ultrasound study. Either parent of the father of the baby is the least likely to participate in social support. The patient's age is the strongest variable affecting who will be the social support person.

Quick Points

- The majority of adolescents and young adults choose to have a social support person for their prenatal ultrasound visit.
- The father of the baby is the most common social support person, followed by the patient's mother.
- Choice of social support and rates of follow-up are not affected by the abnormal ultrasound findings.

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