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Study of Serum and Urinary Calcium Levels in Pregnancy Induced Hypertension Cases in and Around Chitradurga

By Sabitha Bai T, Rudrappa G & Dinesh Javarappa

Chitradurga/ Rajiv Gandhi University India

Abstract- Pregnancy Induced Hypertension (PIH) is defined as multisystem disorder of unknown aetiology causing vasospasm and anoxia and there is a raised blood pressure recorded at least on two occasions at 6 hours apart. It is thought that preeclampsia develop when the pregnancy induced systemic response causes one or more maternal system to decompensate. The high foetal demand for calcium is facilitated by profound physiological interactions between mother and foetus. Biochemical changes in PIH are increased plasma Creatinine, urea and uric acid concentration with proteinuria due to renal glomerular endotheliosis leading to impaired glomerular perfusion and filtration.

A case control comparative study was done with PIH and normal pregnant women both from outpatient and inpatient of Basaveshwara Medical College Hospital and Research Centre, Chitradurga, according to the criteria.

Study group will be followed up every four weeks from 28th week of gestation and 24hour/random urine sample will be collected for Biochemical evaluation of urinary Calcium, Creatinine and protein.

Keywords: PIH, Urinary calcium, Creatinine, Protein and Protein/Creatinine ratio, serum uric acid.

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Study of Serum and Urinary Calcium Levels in Pregnancy Induced Hypertension Cases in and Around Chitradurga

Sabitha Bai T ^α, Rudrappa G ^σ & Dinesh Javarappa ^ρ

Abstract- Pregnancy Induced Hypertension (PIH) is defined as multisystem disorder of unknown aetiology causing vasospasm and anoxia and there is a raised blood pressure recorded at least on two occasions at 6 hours apart. It is thought that preeclampsia develop when the pregnancy induced systemic response causes one or more maternal system to decompensate. The high foetal demand for calcium is facilitated by profound physiological interactions between mother and foetus. Biochemical changes in PIH are increased plasma Creatinine, urea and uric acid concentration with proteinuria due to renal glomerular endotheliosis leading to impaired glomerular perfusion and filtration.

A case control comparative study was done with PIH and normal pregnant women both from outpatient and inpatient of Basaveshwara Medical College Hospital and Research Centre, Chitradurga, according to the criteria.

Study group will be followed up every four weeks from 28th week of gestation and 24hour/random urine sample will be collected for Biochemical evaluation of urinary Calcium, Creatinine and protein.

In this study, it was found that there was significant hypocalcemia ($p < 0.001$), moderately significant elevations of creatinine in urine ($p < 0.01$) and significant increases in urinary protein ($p < 0.001$) was associated with preeclampsia compared to normal pregnant women, further in our study, it was also found that there was moderately significant hypocalcaemia ($p < 0.01$) and significant hyperuricemia ($p < 0.001$) and normal Creatinine levels in blood compared to normal pregnant women. Suggesting that, measurement of calcium in urine along with estimation of protein in urine may be used as screening tests along with estimation of blood levels of calcium and uric acid for confirming PIH cases.

Keywords: PIH, urinary calcium, creatinine, protein and protein/creatinine ratio, serum uric acid.

I. INTRODUCTION

Hypertension is one of the common complications met with pregnancy and contributes significantly to maternal and perinatal morbidity and mortality. There is generalised vasospasm leading to systemic disorders involving all the vital organs of the body. Severity of Hypertensive disease in pregnancy is controllable with proper management in most of the

cases and mortality is avoidable. PIH is a term used to describe new hypertensions which appear after midterm pregnancy (20 weeks) and resolves after delivery. PIH is defined as raised blood pressure recorded at least on two occasions at 6 hours apart (2). It may be either diastolic > 90 mm of Hg or systolic > 140 mm of Hg. Preeclampsia is also associated with significant proteinuria > 300 mg/ 24 hours (3).

Gestational hypertension shows an exaggerated B.P. reference detected first time after mid pregnancy without proteinuria. It is thought that preeclampsia develop when the pregnancy induced systemic response causes one or more maternal system to decompensate. In its clinical phase preeclampsia is a hypocalciuric state and it has been reported that hypocalcemia predicts preeclampsia (9). The pregnant women's body provides daily doses of 50-330 mg calcium to supports development of foetal skeleton (7). This high foetal demand for calcium is facilitated by profound physiological interactions between mother and foetus. Studies of blood calcium level during pregnancy found significantly decreases in total serum as pregnancy progressed (6). Regulation of intracellular calcium plays a key role in hypertension half of the pregnant women with hypertension have preeclampsia. Pregnant women who develop severe preeclampsia have significant low dietary calcium intake compared to normotensive women. A calcium supplement has been hypothesized to reduced chances of PIH and preeclampsia (16). Biochemical changes in PIH are increased plasma Creatinine, urea and uric acid concentration with proteinuria due to renal glomerular endotheliosis leading to impaired glomerular perfusion and filtration. Many studies have been conducted to rule out the etiology, early screening and diagnostic tests, like lipid profile, oxidant and antioxidant status but among these serum and urine calcium levels and calcium metabolism have been studied extensively in PIH and preeclampsia and various conflicting results are given. Study is conducted to know alterations in serum and urinary calcium levels in all PIH cases of hypertension induced in pregnant women in and around Chitradurga.

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II. MATERIALS AND METHODS

a) Inclusion Criteria

50 pregnant women at period (18-20 weeks) of gestation both from out patients and inpatient of BMC Hospital who were following up with their with regular antenatal checkups, followed with regular routine blood and Urine investigations –i.e. Hb, RBS, VDRL, urine routine examination for protein, sugar, pus cells, epithelial cells are examined.

b) Exclusion criteria

Pregnant women who are previously known diabetic, hypertensive and suffering from any illness (mainly renal and hepatic) are excluded from the study.

i. Methods

Study group will be followed up every four weeks from 28th week of gestation and 24hour/random urine sample will be collected for Biochemical evaluation

of urinary Calcium (12), Creatinine (13) and protein by multiple strips (dipsticks) by Roche's Urine Analyser.

3 ml venous blood sample was collected from both PIH cases and normal pregnant women as per the criteria into plane vaccutainers. Blood samples are used for serum Calcium (12), serum Uric acid (14) and serum Creatinine (13). The results were statistically analysed with Students "test".

A case control comparative study was done with PIH and normal pregnant women accordingly to the criteria.

III. RESULTS

The present study included a total number of 100 subjects consists of 50 PIH cases and 50 normal pregnant women. Table-1 narrates the urinary Calcium, Creatinine, Protein and protein-Creatinine ratio in PIH cases and Normal pregnant women.

Table 1 : Table showing the Urinary Protein, Urinary Creatinine, Urinary Calcium and Protein/ Creatinine Ratio in PIH and Normal pregnant women

Parameter	Urinary Calcium (mg/dl)	Urinary Protein (gm/day)	Urinary Creatinine (gm/day)	Protein/Creatinine ratio
Normal pregnant women (n=50)	390.42 ± 34.36	0.080 ± 0.026	1.29 ± 0.33	0.05 ± 0.03
PIH Cases (n=50)	342.92*** ± 52.1	0.333*** ± 0.13	0.76** ± 0.11	0.43* ± 0.17

Note: 1. The number in parenthesis shows the number of samples.

2. Values are expressed as their Mean ± SD.

3. p- value * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table - 2 shows, the serum levels of Uric acid, Calcium and Creatinine in PIH cases and compared with normal pregnant women.

Table 2 : Table showing the serum Uric acid, serum Creatinine and serum Calcium levels in PIH and Normal pregnant women

Parameter	Serum Uric acid (Mg/dl)	Serum Calcium (Mg/dl)	Serum Creatinine (Mg/dl)
Normal pregnant women (n=50)	5.62 ± 1.01	8.95 ± 0.88	0.80 ± 0.13
PIH Cases (n=50)	7.64*** ± 1.39	8.29** ± 0.47	0.898 ± 0.16

Note: 1. The number in parenthesis shows the number of samples.

2. Values are expressed as their Mean ± SD.

3. p- value * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

IV. DISCUSSION

Table-1 shows a comparative study between PIH and normal pregnant women on parameter Creatinine, calcium, protein and protein/ Creatinine ratio.

It is seen that the urinary calcium in PIH cases is significantly decreased ($p < 0.001$) as compared to normal pregnant women.

Studies have shown marked hypocalciuria in PIH cases Taufield et. al. (11). Sanchez Ramos et. al.

(10) has reported decreased calcium in third trimester of PIH cases. Bilgin et.al. (1) have reported hypocalciuria in cases of PIH compared to normal pregnant women .Ramos et.al. (8) reported that 24 hour Calcium <100mg may confirm suspected case of preeclampsia.

The Urinary protein levels in PIH cases is significant increase ($p < 0.001$) as compared to normal pregnant women. The proteinuria in PIH cases as compared to normal pregnant women is probably due to renal glomerular endotheliosis leading to impaired glomerular perfusion and filtration.

Total protein excretion in urine is considered as abnormal in pregnant women when it exceeds 300mg/24 hours.

The urinary creatinine levels in PIH cases decreased as compared to ($p < 0.001$) normal pregnant women. GFR and renal blood flow raised markedly during pregnancy results in physiological fall in the serum Creatinine concentration. Urine protein excretion increases substantially due to combination of increased GFR, increased permeability of glomerular basement membrane. The protein/Creatinine ratio in PIH cases is marginally increased as compared to normal pregnant women. Thus the pathogenesis of hypocalciuria in PIH is controversial and theoretically may be due to decreased calcium uptake by the foetus and/or increased renal tubular absorption of calcium (5).

The serum uric acid levels are significantly increased ($p < 0.001$) in PIH cases compared to normal pregnant women (Table-2) and this supports the theory of uric acid role in vascular damage and in oxidative stress, the renal lesion of glomerular endotheliosis is mostlikly caused by circulating anti endothelial factors such as soluble fms- like tyrosinekinase-1, it is conceivable that uric acid may synergise with soluble fms- like tyrosinekinase-1, to induce endothelial dysfunction also the afferent arteriolar disease is seen in individuals with PIH, which explains development of hypertension in PIH (4).

In this study, it was found that significant hypocalciuria was associated with preeclampsia, suggests that, calcium measurement may be useful in screening for the PIH cases.

In a conclusion, hypocalciuria and hyperproteinuria is important feature of severe preeclampsia and probably indirectly related to the altered renal function seen in toxemia of pregnancy (15).

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Impacted Foreign Body to the Anterior Orbit-A Case Report

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Abstract- A 41 year old welder presented with the hook of a metallic spring impacted in the right medial and upper part of the orbit after being hit accidentally while working on a motorcycle. An orbital x-ray was done to determine the orientation and location of the hook of the metallic spring. The metallic spring was removed as guided by the radiographic image. Plain radiography proved helpful in forming a scheme for the management of this patient.

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Impacted Foreign Body to the Anterior Orbit- A Case Report

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Abstract- A 41 year old welder presented with the hook of a metallic spring impacted in the right medial and upper part of the orbit after being hit accidentally while working on a motorcycle. An orbital x-ray was done to determine the orientation and location of the hook of the metallic spring. The metallic spring was removed as guided by the radiographic image. Plain radiography proved helpful in forming a scheme for the management of this patient.

I. INTRODUCTION

Orbital foreign body may present with varying signs and symptoms depending on the size, location, and composition of the agent of injury¹. Penetrating injuries to the orbit usually occur from high missile objects which could arise during occupational activities that involve heating metals like welding, carpentry, panel beating or from gunshot injuries. Objects could be retained within the orbit unnoticed² if they are inert, small or without obvious signs of penetration on the ocular surface. Larger objects are usually very obvious because of the external extension in most cases. The role of radiological investigations cannot be overemphasized in cases like these. Plain film radiography is useful in detecting radiopaque objects. CT scan helps to identify the presence and location of metallic objects while MRI is useful for non metallic objects like glass, plastic and wood³. The globe may be spared or involved depending on the extent and axis of penetration. A case report of a man with unusual accidental impaction of a metallic object in the right orbit is hereby presented.

a) Case report

We report a case of a 41 year old welder who presented in our ophthalmic facility with an impacted right orbital foreign body of 6 hours duration. He sustained injury while trying to fix the brake of a motorcycle. The retaining spring of the brake pad was said to have sprang back accidentally with a resultant penetration and impaction in the anterior orbit. There was history of associated bleeding from the medial canthal region with progressive eyelid swelling. He claimed to have good vision in both eyes before the injury. He was not wearing any protective eye device at the time he sustained the injury.

Significant findings at presentation were complete mechanical ptosis on the right with some bleeding from the right medial canthal region and nasal cavity. He was immediately referred for an orbital X-ray which revealed a metallic foreign body in the anterior orbit (Fig. 2) with the external extent of the spring lying as far as the neck inferiorly. Generous local anesthetic agent was applied and the metallic object was removed following the direction denoted by the shape of the curved tip of the spring within the anterior orbit. (fig3)

After removal, visual acuity was done (manually lifting the ptotic lid) and was found to be 6/24⁺¹. Vision in the contra lateral eye was 6/9⁺². Conjunctival was injected with some degree of chemosis. Anterior segment was normal. Pupil was round, regular and briskly reactive. Fundoscopy revealed pink disc, with normal vessels and macula. Findings on the other eye were essentially normal. Patient was given injection tetanus toxoid and commenced on intravenous ceftriazone and frequent topical ciprofloxacin. Analgesic (oral acetaminophen) and acetazolamide was also commenced.

He was seen 1st day post removal of foreign body (Fig. 4). Ptosis and conjunctival chemosis were resolving (fig 3) but there was mild subconjunctival hemorrhage inferiorly. Visual acuity unaided was 6/6. Intraocular pressure was normal. Patient had intravenous antibiotics for 72 hours after when he was commenced on oral antibiotics. (fig.5) He was given a week appointment but did not show up but telephone communication with him confirmed that he was well without any complaint.

II. DISCUSSION

Penetrating orbital injury has been reported in various parts of the world and can be due to varying agents such as metal⁴, wood⁵, plastic⁶ and glass. Injuries due to metallic objects and glass have been found to be more frequent than organic foreign bodies⁴. Our patient presented with an obvious impacted anterior orbital metallic foreign body. Orbital foreign body could be very obvious especially when there is an external component⁷ or pass unsuspected only to be detected by radiological investigations^{5, 8} or when patient present with symptoms related to the effect of the agent of injury. The age of this patient is in agreement with what has been observed that orbital foreign bodies are more

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common in men than in women and in younger rather than older people^{4, 9}. An explanation for this could be that males are usually more exposed to the high risk activities that increase the risk of such injuries. The injury in this patient was occupationally related and accidental. Even though injuries can also be self inflicted¹⁰, accident is a more common mechanisms.⁴

Extra care is required in the management of a patient like this because of the nature of the object involved. The risk of globe perforation can be increased by poor handling of the agent of injury. In order to minimize this risk, an orbital x-ray was done to identify the position of the object as well as the orientation in relation to the globe. Although CT scan is the most recommended for most ocular foreign bodies while MRI offer a better alternative except for magnetic sensitive objects¹¹. Management of this patient would have been bedeviled by the twin problem of non- availability and affordability of recommended investigative procedure if cheaper and easily available alternative had been ignored. Our patient could not get a CT scan done because it was not available in the environment of care. The nearest location was about 120km from the place of care. In addition, this patient was in the low socioeconomic class and insisting on the test would have delayed intervention and possibly increase the risk of ocular morbidity. The absence of a CT scan was however a limitation in the investigation of this patient. Intravenous and topical antibiotics were administered in order to prevent the occurrence of a secondary orbital infection¹. Outcome of orbital trauma can vary with agent of injury, velocity of impact and attributes of the projectile. There was a good visual outcome in our case evidenced by the visual acuity unaided of 6/6 by the 2nd day post removal of foreign body. Factors that have been found to determine the final outcome of eye injury are the quality of care, preexisting eye status, severity of initial lesion and the first aid treatment provided and the time between injury and definite care¹². The good outcome in this patient was partly due to the absence of globe involvement as well as prompt intervention within 24hours of injury. The eyeball was spared in this patient as evidenced by the post-treatment visual acuity of the patient and absence of ocular abnormality on detailed examination after removal of the foreign body. Some patients could present with injuries to the eyeball as was reported by Okoye¹³ in southeast Nigeria where projectiles such as gunshot pellet, metal pieces, splinter of glass and wood were responsible for most of the eye injuries(73.2%) necessitating hospitalization. More Severe cases of injuries with projectile objects can present with trans orbital intracranial penetration of the agent of injury¹⁴. Our patient had developed severe lid edema with resultant mechanical ptosis at the time he was seen because the injury had been sustained for about 6hours before presentation. However the rapidity

with which the edema resolved was a prove of the appropriateness of intervention⁹. The injury could have been entirely preventable by the use of protective eye device¹⁵.

III. CONCLUSION

Early intervention and absence of globe involvement greatly influenced the outcome of this patient and helped to minimize ocular morbidity. There is need to legislate the compulsory use of protective eye device by artisans who engage in activities with risk of ocular injuries. When penetrating orbital injuries occur in places where CT scan is not readily available plain X-ray should be done to determine the orientation of radiopaque objects so as to minimize risk of iatrogenic ocular damage.



Figure 1



Figure 2



Figure 3





Figure 4



Figure 5 : Post operative day 4

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Encouraging Active Stress Management Among Graduate Students: Formative Research for A Persuasion Through The Stages Approach

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Abstract- Stress is prevalent among graduate students and can be problematic for their work, academics and health. Interventions aimed at stress management have aided student populations in the past and may be appropriate among graduate students, especially if theoretically driven. An online survey guided by social judgment theory, the transtheoretical model, and perceived behavioral control was conducted to collect formative research for an intervention regarding stress management for graduate students. Although results demonstrate stress is common among this audience and many students are actively managing their stress, negative academic and lifestyle consequences from stress are still abundant. A stage approach through a social norms intervention involving the assistance of faculty may improve this issue.

Keywords: *graduate students, stress management, social judgment theory, transtheoretical model, formative intervention research.*

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Encouraging Active Stress Management Among Graduate Students: Formative Research for A Persuasion Through The Stages Approach

Samantha Nazione ^α, Kristin Pace ^ο, Alicia Shugart ^ρ & Sandi Smith ^ω

Abstract- Stress is prevalent among graduate students and can be problematic for their work, academics and health. Interventions aimed at stress management have aided student populations in the past and may be appropriate among graduate students, especially if theoretically driven. An online survey guided by social judgment theory, the transtheoretical model, and perceived behavioral control was conducted to collect formative research for an intervention regarding stress management for graduate students. Although results demonstrate stress is common among this audience and many students are actively managing their stress, negative academic and lifestyle consequences from stress are still abundant. A stage approach through a social norms intervention involving the assistance of faculty may improve this issue.

Keywords: *graduate students, stress management, social judgment theory, transtheoretical model, formative intervention research.*

I. INTRODUCTION

America's two million graduate students are at risk for chronic stress due to academic and career demands (Heins, Nickols Fahey, & Leiden, 1984; Mallinckrodt, Leong, & Kralj, 1989; NCES, 2007; Rocha-Singh, 1994). Consequences of chronic stress include poor academic performance, greater susceptibility to chronic and life-threatening diseases such as cancer and heart disease, and economic losses for employers (Akgun & Ciarrochi, 2003; Goetzl, Anderson, Whitmer, Ozminkowski, Dunn, & Wasserman 1998; NIH, 2002). Nearly half of graduate students report stress significantly affects them and they feel overwhelmed frequently or constantly (Hyun et al., 2006). Studies of medical, law, and graduate students have found stressors include time restrictions, economic issues, academic issues, environmental issues, familial issues, dealing with deadlines, ambiguous expectations, and trying to balance school with social life (Heins et al., 1984; Hyun, Quinn, Madon & Lustig, 2006; Mallinckrodt et al., 1989; Rocha-Singh, 1994).

A common response to stress is to utilize coping mechanisms (Lazarus & Folkman, 1984; Selye, 1956; 1976). Numerous coping styles of varying levels of efficacy exist including avoidance, wishful thinking,

planning, acceptance, disengagement, social support and religion (Carver, Scheier, & Kumari Weintraub, 1989; MacGeorge et al., 2005; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985). One effective strategy to manage stress and build individuals' coping repertoires is through crafting interventions (Murphy, 1996; Serxner, Gold, Grossmeier, Anderson, 2003; Sheehy & Horan, 2004).

a) Interventions

Stress interventions that have been conducted for undergraduate and law students have demonstrated positive impacts on stress management. For example, an online stress intervention for undergraduate students called My Student Body-Stress included peer stories about stress, frequently asked questions about stress, health news, and interactive tools to learn about stress consequences and management techniques, whereas the control website only contained text-based stress information. The experimental participants improved their ability to manage stress significantly as compared to control participants through such methods as increased exercise and decreased anxiety (Chiauzzi, Brevard, Thurn, Decembrele, & Lord, 2008). Another example of a successful intervention for law students utilized stress inoculation training (SIT), which is the process of forewarning individuals about upcoming stressors and teaching them how to cope. Law students who received SIT were found to have significantly lower emotional, personal, and general stress, as well as lower levels of anxiety and irrationality as compared to non-participating students. Additionally, participants in the bottom 20% of their class improved academically (Sheehy & Horan, 2004).

As evidenced by this literature, a stress management intervention targeting graduate students has the potential to have several beneficial outcomes. Improving attitudes toward stress management, while emphasizing the benefits of available services in coordination with an intervention, will ideally result in both better health and academic outcomes for graduate students as well as produce a return on the university's financial investment in this population. Persuasive communication theories provide solid frameworks for formative research on such objectives.

Scholars have noted the importance of using models and theories of change for stress management

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(Cohen & Welch, 2000; Murphy, 1996). Following this advice, this study uses two theories of change, social judgment theory (SJT; Sherif, Sherif, & Nebergall, 1965) and the transtheoretical model (TM; Prochaska, Velicer, DiClemente, & Fava, 1988), in addition to using perceived behavioral control (PBC) from the theory of planned behavior (TPB; Ajzen, 1985). Together, these theories provide a firm direction for understanding student attitudes and barriers toward stress management and identifying directions for an intervention to promote stress management attitude and behavior change.

b) Theories

SJT proposes that in order to change attitudes, the audience's attitudes toward the full spectrum of possible stances for a particular topic must be assessed (Sherif & Hovland, 1961; Sherif, Sherif, & Nebergall, 1965). It is necessary to know which positions the audience agrees with (latitude of acceptance; LOA), disagrees with (latitude of rejection; LOR), and which they neither agree nor disagree with (latitude of noncommitment; LON). These latitudes are commonly measured on ordered alternative scales (OAS), which express the different positions an individual could take toward a specific topic. SJT contends that only messages within the latitude of acceptance or noncommitment will elicit positive attitude change, with messages within the latitude of noncommitment producing the most favorable attitude change. Alternatively, messages in an individual's latitude of rejection will prevent attitude change or produce undesirable attitude change. Hence, it may take several persuasive attempts to move individuals to the desired attitude (Sherif et al., 1965).

The TM proposes that behavior change is a process that occurs in distinct, conceptual stages (DiClemente & Prochaska, 1982; Prochaska, 1984; Prochaska, Velicer, DiClemente, & Fava, 1988). The TM has two main parts: the stages of change and the ten processes of change. This manuscript will focus on the stages of change. There are six stages that people may experience when making lifestyle changes. In the pre-contemplation stage, individuals have no intention of changing for at least the next six months. In the contemplation stage, individuals have the intention of changing within the next six months. In the preparation stage, individuals have the intention to change in the next month and prepare themselves. In the action stage, the change occurs and in maintenance, change is sustained. Finally, in termination, the individual feels no temptation to relapse and feels completely able to maintain their changed lifestyle (Prochaska et al., 1988).

The PBC construct originates from the TPB, and it is defined as the perceived degree of ease for performing a particular behavior (Ajzen, 1985). PBC has two related components: perceived self-efficacy and

perceived controllability (Ajzen, 2002). Perceived self-efficacy is an individual's belief that they are capable of performing a given behavior. Perceived controllability is an individual's perception of the likelihood that impeding or facilitating factors, of varying power, will be present and affect their ability to perform the desired behavior (Ajzen, 2002). These can often be thought of as barriers that prevent the individual from engaging in the behavior. Past literature supports that perceived control is a crucial factor in stressful situations (Lazarus & Folkman, 1984; Misra & Mckean, 2000; Nonis et al., 1998). A high level of perceived control typically strengthens behavioral intention, increases behavioral effort, and increases perseverance (Ajzen, 2002).

SJT and the TM both acknowledge that attitude and subsequent behavior change is a slow process, often occurring in stages. They also recognize the benefit of understanding the full spectrum of these stages in order to create effective messages. However, SJT is focused on attitude change, while the TM is focused on behavior change. PBC adds two essential components of behavior change, overcoming barriers and self-efficacy. Together, they build upon each other for increased predictability of outcomes, which will provide guidance for campaign creation.

As stress has been determined to be a major problem for graduate students, the goal of this research is to determine which messages will be most likely to persuade this target audience to more effectively manage their stress. Three research questions were generated.

RQ 1 : According to SJT, what stress management messages fall within graduate students' LOA, LON and LOR?

RQ 2 : Where do graduate students fall regarding their readiness to manage their stress in the stages of TM?

RQ 3 : What are graduate students' current levels of PBC regarding stress management and what factors or barriers contribute to these levels?

II. METHODS

a) Participants

The participants were 572 Master's and Ph.D. students from a large Midwestern university. Forty-four percent of the participants were female, 16% were male and 40% of students did not list their gender. Forty-seven percent were European American, 2.3% were African American, 5.3% were Asian, 0.3% were Arabic, 0.5% were Latino, 0.6% were Pacific Islander, 5.4% were other, and 40.9% did not list their ethnicity. Fifteen percent of participants were in a MA program, 14.3% were in a MS program, 30.2% were in a PhD program and 40.4% did not list their program. Ages of participants ranged from 21 to 59, with the average age being 31.38 (SD = 8.45).

b) Procedures

This research utilized an online survey. The survey was pretested using ten eligible individuals. As a result of this pre-test, a definition of stress was added and wordings of several questions were altered slightly to improve clarity. A randomly generated list of graduate students totaling 25% of the total graduate student population were notified of their eligibility through an email delivered by the university's Office of the Registrar. All information was collected anonymously.

First, participants read the definition of stress (a negative feeling of being under emotional pressure) and reported whether they agreed, disagreed, or were neutral regarding the spectrum of nine positions on two ordered alternative scales (OAS). These scales were modeled after previous OASs for SJT research (Sherif & Hovland, 1961). The first OAS measured the degree of certainty that students had regarding whether they could be successful during graduate school without being stressed. The second OAS measured students' judgments regarding whether it is essential for graduate success to either actively manage or simply endure stress.

Following these scales, participants reported whether or not this stress had caused them academic harm. Questions were then asked regarding coping mechanisms, stress management barriers, and methods for overcoming these barriers. Participants were able to choose multiple applicable answers, and they were asked to rank their responses from most to least significant, with one being the most significant. Past studies of stress were used as guides for the creation of these lists (Akgun & Ciarrochi, 2003; Barefoot, Dahlstrom, & Williams, 1983; Carver et al., 1989; Dixon & Robinson Kurpius, 2008; Eaton & Bradley, 2008; Heins et al., 1984; Helmers et al., 1997; Lavallo, 1997; Taylor, 2006).

Seven point Likert scales, (1 = SD, 7 = SA), were used to assess participants' beliefs about their ability to manage stress, whether their stress was indicative of their effort and likelihood of success, whether they experienced barriers to stress management, and their capacity to overcome those barriers (measuring PBC). Participants then identified which stage of the TM they were in with regard to managing their stress, using a scale adapted from past work (Nigg et al., 1999). Finally, participants reported demographic information including their age, gender, race, and program level (MA/MS or PhD).

III. RESULTS

Student stress levels were assessed on a seven point Likert scale (1 = very low stress on the average day, 7 = very high stress on an average day). The mean score was 4.23 (SD = 1.43). Students were also asked

to report how often they were negatively stressed (1 = never, 7 = all the time). The mean for this scale was 4.84 (SD = 1.21). Participants were also asked to respond to the question "while in graduate school, if I am not stressed, I worry that I am not working hard enough to be successful" (1 = SD, 7 = SA). The mean for this question was 3.67 (SD = 1.97). Additionally, close to half of participants (N = 406, 48.8%), reported that stress had negatively impacted their academic career in some form.

a) Research Question One

The first research question was interested in the latitudes of each statement on both of the OAS scales used in this research. The statements used for the OAS scales can be found in Table 1. For each OAS scale, four non-parametric chi-square tests were run to determine the latitude of each statement. The first chi-square test determined whether there were significant differences between the latitudes (the percent choosing agree, neutral and disagree for each statement on each OAS scale). The remaining three chi-square tests determined what specific latitudes differed by comparing the percentage choosing agree, to the percentage choosing neutral; the percentage choosing neutral to the percentage choosing disagree; and the percentage choosing agree to disagree. Statements were determined to fit in the LOA if the percentage of participants selecting "agree" was significantly greater than the percentage selecting "neutral" or "disagree." Similarly, if the significantly greatest percentage of participants chose "neutral," or "disagree" the statement was determined to be in the LON or LOR respectively.

The first OAS scale focused on the student's view of how stress was associated with success during graduate school. The first five statements were found to be in the latitude of acceptance (LOA). The last four statements were found to be in the latitude of rejection (LOR). No statements resided in the student's latitude of non-commitment (LON). Table 1 shows the percentages, significantly different groups, p-values and chi-square statistics from the overall chi-square tests run on each statement, sample sizes, and latitudes.

The second OAS scale examined students' views of how active stress management was associated with success in graduate school. The first four statements fell under the LOA. The final five statements fell under the LOR. None of the statements fell under the LON. Table 2 shows the percentages, significantly different groups, p-values and chi-square statistics from the overall chi-square tests run on each statement, sample sizes, and latitudes.

b) Research Question Two

The second research question centered on determining graduate student positions along the

stages of change continuum. This research question was investigated by examining the frequencies of response to a question which asked students to select the stage that depicted their current stress management activities. Most of the students who answered this question (N = 339) selected the maintenance phase, followed by contemplation, preparation, pre-contemplation, and action. A non-parametric chi-square test demonstrated that these categories were significantly different from each other, $\chi^2(4, n = 339) = 236.74, p < .001$. More specifically, the maintenance phase was found to include significantly more participants in comparison to the precontemplation phase, $\chi^2(1, n = 218) = 95.12, p < .001$, the contemplation phase, $\chi^2(1, n = 225) = 83.42, p < .001$, the preparation phase, $\chi^2(1, n = 221) = 89.96, p < .001$, and the action phase, $\chi^2(1, n = 218) = 95.12, p < .001$. None of the other categories were found to be significantly different from each other. Table 3 reports specific frequencies for each phase.

c) *Research Question Three*

The third research question was specifically interested in graduate students' current levels of PBC regarding stress management and the factors that contribute to those levels. First, students were asked if they felt they could effectively manage their negative stress (1 = SD, 7 = SA). This question had a mean of 5.28 (SD = 1.33). Next, students were asked to rank the techniques they found most valuable for managing their negative stress out of 20 categories. The three techniques most frequently ranked as the number one negative stress management tool were exercise (30%), seeking support from friends and family (16.9%) and making a plan of action or a to-do list (16.8%). Table 4 reports the percentage of participants who ranked each tool as number one.

Research question three also examined the barriers students experience in terms of stress management. To explore barriers to stress management, participants were asked to rank the barriers that applied to them out of 19 categories. The most frequently reported barriers ranked as number one were stress management was not a priority (36.1%), not having enough time (35.9%), and having too many responsibilities (19.2%). Table 5 reports the percentage of participants who ranked each barrier as number one.

Participants were then asked to report if they felt they could overcome these barriers on a seven point Likert scale (1 = SD, 7 = SA). The mean was 5.08 (SD = 1.50). To follow up, participants were asked to rank the methods they used to overcome these barriers from 12 possible methods. The most frequently cited methods ranked number one were to prioritize (49.1%), cut back on responsibilities (19.0%), and learn to let things go (16.1%). Table 6 reports the percentage of participants who ranked each method as number one.

IV. DISCUSSION

The purpose of this study was to explore how students view stress and its relationship to success in graduate school, examine the current actions students are taking to address their stress levels, and understand the barriers students experience when it comes to managing stress. This information, taken via an online survey, is essential in creating a basis for interventions targeting stress management in graduate students.

The results of the OASs used suggest that students view stress to be an inevitable, and perhaps necessary, aspect of the graduate student experience that should be managed. Specifically, the results from the second OAS indicated that "to be successful in graduate school it is absolutely essential to actively manage my stress" was in the student's LOA. As positive attitudes toward stress management was the preferred attitude, this finding would suggest that messages encouraging stress management as a way to be successful in graduate school should be used. Despite this, results from the first OAS indicate that students do not believe that one can be successful in graduate school without being stressed, as these statements were firmly in the LOR. Hence, messages like this should not be disseminated to the graduate students as they may produce unintended effects (Sherif et al., 1965). Following SJT, the best statement to begin promoting a positive attitude toward stress management would be "It is somewhat likely for me to be successful during graduate school without being stressed," which was the closest statement, within the student's LOA, to our preferred attitude. Also of importance regarding the OAS findings, is that none of the messages addressing stress and graduate school success fell into the students' LON. This may be indicative of student's high ego-involvement, or commitment to this issue, and therefore, demonstrates that the persuasion process would be difficult (Sherif et al., 1965). In this case, persuasion will be a process that needs to take place in stages to move students toward more healthy attitudes of stress and stress management.

In line with students' belief that success requires active stress management, significantly more students indicated that they were in the maintenance stage, than any other phase. These students indicated that they have been taking action to manage their stress for at least the past six months. The remaining students were nearly equally distributed between the pre-contemplation, contemplation, preparation, and action stages.

When the SJT and TM findings are viewed in light of one another, it appears that students believe that although stress is a natural part of the graduate school experience, managing stress is also an important aspect to being successful in graduate school. Furthermore, the majority of students (64.3%) indicated that they had

at least started the process of actively managing their stress. Nonetheless, results also suggested that students often do feel stressed, that they feel capable of dealing with stress, and yet they are still suffering from the consequences associated with stress. Many students indicated that stress did affect their academic performance. When it came to managing this stress the three most common techniques were to exercise, seek support from friends and family, and make a to-do list. Notably, these are all positive methods, whereas techniques such as taking drugs or alcohol received few responses.

Barriers to managing stress included stress management not being a priority, not having enough time and having too many responsibilities. Taking into account past research, it appears that a lack of time/too many responsibilities is a leading cause of stress (Heins et al., 1984; Hyun, Quinn, Madon & Lustig, 2006; Mallinckrodt et al., 1989; Rocha-Singh, 1994), but also the reason that students do not engage in stress management activities. Furthermore, it also appears that many students do engage in stress management activities, but prefer to find answers on their own rather than attending university-offered programs. Seeking out information on stress management was the strategy that had the lowest ranking.

a) *Intervention Implications*

Past research has suggested that interventions are one of the most effective ways for individuals to learn how to manage their stress (Bekker et al., 2001; Chiauzzi et al., 2008; Sheehy & Horan, 2004) and that it is important for schools to play a role in managing student stress (Donald et al., 2005; Misra, McKean, West, & Russo, 2000). There are several different types of interventions that could be useful in addressing stress management for graduate students. One of the ways this can be done is to create an intervention addressing stress management for graduate students. From an SJT perspective, it appears that the most effective messages that will begin to move students toward the preferred attitude are those which emphasize that it might be possible to succeed in graduate school without stress and that it is essential to manage stress for success. By pairing these messages with efficacy messages that highlight the more individual, non-time consuming activities that students can do to manage stress, students may be more willing to take action. A past intervention that was web-based may provide a good foundation when the results from this study, which may suggest a need for privacy, are taken into account (Chiauzzi et al., 2008).

Intervention messages also need to utilize the stages of change model. It would be beneficial to have two targeted audiences, those who already practice stress management and those who do not. Targeting messages would be devised using the ten process of

change (DiClemente & Prochaska, 1982; Prochaska, 1984; Prochaska, et al., 1988). Messages targeting those who already engage in stress management should focus on providing belief enforcement and support messages, while messages targeting those who are in the pre-contemplation to preparation stages could focus on stress awareness and efficacy building.

Overall, a social norms focused intervention may be effective, given that students do not appear to openly accept help with stress management. Messages could include statistics demonstrating that the majority of graduate students actively manage their stress, and also present testimonials describing how fellow students manage their stress using various non-time consuming activities. An online intervention similar to Chiauzzi et al., (2008) may be successful in that it allows for students to seek stress management assistance in a more private setting.

Additionally, interpersonal level mentorships from supervisors (faculty) and peers is another strategy that has been shown useful in addressing workplace stress (Sosik & Godshalk, 2000) and student stress (Allen, McManus, & Russell, 1999; Kersling & Kochar, 1990). Similarly, mentorships could be beneficial at the graduate level. Instructors and advisors can use non-intrusive support messages that reflect students can succeed in graduate school without high levels of stress as well as point students to healthy management strategies. Modeling healthy stress management behaviors may also be effective.

b) *Limitations and Future Research*

This study experienced a large amount of attrition. We believe this might be a result of the format of the survey, including the redundancy of answering OAS scale questions and the ranking items on the survey. Students were asked to rank only those items which applied to them rather than ranking complete lists, but we know from participant feedback that these directions were misunderstood. Due to the generally descriptive nature of this study we do not feel this limitation trivializes our results.

Another limitation was the timing of this study. Data collection took place after the beginning of the summer term. In order to examine the effects of this timing, students were asked to report their current stress levels as relative to normal stress levels at the end of the survey on a Likert scale (1 = much less stressed than normal, 5 = much more stressed than normal). The mean for this question was 2.84 (SD = 1.10). A one-sample t-test revealed that this was significantly different than the mean of three ($p < .05$), however only slightly. Hence, the survey may represent a more conservative view of stress in graduate students.

Future research should seek to correct for these errors by running the survey with different populations of graduate students and at different times. Another

interest, specifically for the development of a campaign would be to examine how responses to the stress items differ by individual attributes, as past studies have shown these variables to present effects (Dixon & Robinson Kurpius, 2008; Eaton & Bradley, 2008; Heins et al., 1984; Helmers et al., 1997; Misra & McKean, 2000). In this manner, targeted campaigns could be crafted for particular groups in order to increase effectiveness. Finally, the campaign should be carried out as well so that it may be evaluated.

V. CONCLUSION

Stress is costly to those who experience it, as well as to their employers. Health, learning, work, and success are at risk, however little research and few interventions have been completed on college campuses for graduate students. This study used two persuasive communication theories SJT and the TM, along with the persuasive construct of PBC, to examine graduate students' attitudes and behaviors in favor of stress management. Findings from this proposed study could be used to produce a stress management invention for graduate students using both mediated messages as well as interpersonal influence. Such an intervention would benefit graduate students' health and academics, while reducing costs for universities nationwide.

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Table 1: Latitude results for Success in Graduate School and Stress OAS

Statement	% Disagree	% Neutral	% Agree	χ^2	p value	N
It is impossible for me to be successful during graduate school without being stressed	34.1a	31.5a	34.4a	0.95	p>.05	572
It is highly unlikely for me to be successful during graduate school without being stressed	22.5a	20.4a	57.2b	145.50	p<.001	570
It is unlikely for me to be successful during graduate school without being stressed	16.9a	18.1a	65.0b	258.77	p<.001	569
It is somewhat unlikely for me to be successful during graduate school without being stressed	24.2a	30.8b	45.0c	38.81	p<.001	562
Whether or not I am stressed is not central to my graduate school success	29.7a	30.6a	39.8b	10.38	p<.001	566
It is somewhat likely for me to be successful during graduate school without being stressed	38.6a	34.3b	27.1b	11.30	p<.001	557
It is likely for me to be successful during graduate school without being stressed	56.5a	23.8b	19.7b	136.77	p<.001	558
It is highly likely for me to be successful during graduate school without being stressed	67.1a	20.4b	12.5c	294.75	p<.001	560
It is certain that I will be successful during graduate school without being stressed	76.2a	17.8b	6.0b	478.85	p<.001	563
<i>*Bolded latitudes represent whether the statement fell in the latitude of acceptance, non-commitment, or rejection. The letters next to percentages indicate significantly different groups.</i>						

Table 2 : Latitude Results for Success in Graduate School and Active Stress management OAS

Statement	% Disagree	% Neutral	% Agree	χ^2	p value	N
To be successful during graduate school it is absolutely essential to actively manage my stress	5.4a	26.3b	68.3c	249.59	p<.001	407
To be successful during graduate school, it would be best to actively manage my stress	2.7a	11.1b	86.2c	515.03	p<.001	405
To be successful during graduate school, it would probably be better to actively manage my stress	3.0a	13.7b	83.3c	461.01	p<.001	402
To be successful during graduate school, it might help to actively manage my stress	4.9a	20.9b	74.1c	321.47	p<.001	406
Whether I actively manage my stress or endure my stress is not central to being successful during graduate school	64.1a	24b	11.9c	182.50	p<.001	404
To be successful during graduate school, it might help to just endure my stress	50.4a	29.2b	20.4c	56.08	p<.001	401
To be successful during graduate school, it would probably be better to just endure my stress	64.7a	25.1b	10.2c	190.19	p<.001	402
To be successful during graduate school, it would be best to endure my stress	74.5a	18.3b	7.2c	314.02	p<.001	404

To be successful during graduate school, it is absolutely essential to just endure my stress	78.7a	14.6b	6.7c	378.18	p<.001	403
<i>*Bolded latitudes represent whether the statement fell in the latitude of acceptance, non-commitment, or rejection. The letters next to percentages indicate significantly different groups.</i>						

Table 3: Stages of Change Frequencies

Question	Stage	Percent
I do not intend to start taking action to effectively manage my stress in the next 6 months	Pre-contemplation	10.9
I intend to start taking action to effectively manage my stress in the next 6 months	Contemplation	13.0
I intend to start taking action to effectively manage my stress in the next 30 days	Preparation	11.8
I have been taking action to effectively manage my stress for less than 6 months	Action	10.9
I have been taking action to effectively manage my stress for at least 6 months	Maintenance	53.4

Table 4: Percent of Participants that Ranked a Given Negative Stress Reduction Technique as Number One

Technique	Frequency	N
Improve sleeping habits	13.4	243
Exercise	30	290
Do something creative/hobby	4.9	206
Think about how the challenge will make me grow/make me stronger	6.5	214
Try to remain positive	9.5	297
Seek support from friends/family	16.9	308
Find a way to vent my emotions	5.9	238
Drink alcohol	2.8	178
Take prescription drugs	2.8	106
Take illicit drugs	2.2	92
Eat comfort foods	3.7	241
Attend a university support group/wellness class	0	87
Meditate	0.8	121
Make a plan of action/to-do list	16.8	285
Escape into movies, television, music, or novels	5.5	254
Renegotiate work/deadlines	0	164
Pray/spend time with religion	11.8	178
See therapist/psychologist/counselor	3.3	123
Avoid thinking about the situation	1.2	165
Accept the situation and move on	9.7	236

Table 5: Percent of Participants that Ranked a Given Barrier to Negative Stress Reduction as Number One

Barrier	Frequency	N
I have too much stress	4.6	350
I have too many responsibilities	19.2	130
I don't have enough time	35.9	206
It's not my priority	36.1	227
I put other people before myself	11.1	90
I am just a stressed person	18.2	176
My significant other doesn't want me to change anything	17.2	116

I am afraid of what would happen or who I would be if I changed things	3	67
I have an inconsistent schedule	4	75
It would be too much work	7.3	123
I don't have enough energy	3.8	79
I am not motivated	6.3	126
I am not interested	10	100
I am not capable	2.9	69
I don't know how	1.5	69
I don't believe anything will help	13.3	98
I lack financial resources	1.3	79
I lack social support	8.6	93
I don't feel that now is the right time for me to manage my stress	0	74

Table 6: Percent of Participants that Ranked a Given Method to Overcome Barriers to Negative Stress Management as Number One

Method	Frequency	N
Cut back on my responsibilities	19	133
Choose to put myself first	15.6	128
Learn to let things go	16.1	193
Prioritize	49.1	269
Seek out information on stress management	1.3	77
Recruit social support	7.6	132
Manage time well	13.6	213
Multi-task	4.4	80
Develop a buddy system	3.8	314
Keep organized	12	225
Take happiness in the little things	7.3	178
Religion/spirituality	11.2	125





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High Unmet Need for Family Planning and Factors Contributing to it in Southern Ethiopia: A Community Based Cross-Sectional Study

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Abstract- Unmet need is defined as not using contraceptives despite expressed demand for limiting or spacing a child exists to varying degrees in virtually every developing country for various reasons. There is limited knowledge about the extent and associated factors of unmet need for family planning in the study area. Therefore this community based cross-sectional study was conducted. The overall unmet need for family planning was 41.5%. It was relatively lower among currently married women that 34.4% of currently married women had unmet need for family planning. More than 50% of the demand for family planning was not met. Factors like ethnicity, age of the participant, participant's education, husband's occupation, having discussion about family planning with partner in the last 6 months and gravidity were independent predictors of unmet need for family planning among currently married women. Efforts to be exerted were recommended in order to reduce this high rate of unmet need by focusing on those kebeles which Wolayta and Zeyse tribes live, older age, illiterates and those with high gravidity.

Keywords: *unmet need, family planning, cross-sectional, ethiopia, magnitude, associated factors, community based.*

GJMR-K Classification: *NLMC Code: WA 550*



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High Unmet Need for Family Planning and Factors Contributing to it in Southern Ethiopia: A Community Based Cross-Sectional Study

Girma Temam Shifa ^α & Mekdes Kondale ^σ

Abstract- Unmet need is defined as not using contraceptives despite expressed demand for limiting or spacing a child exists to varying degrees in virtually every developing country for various reasons. There is limited knowledge about the extent and associated factors of unmet need for family planning in the study area. Therefore this community based cross-sectional study was conducted. The overall unmet need for family planning was 41.5%. It was relatively lower among currently married women that 34.4% of currently married women had unmet need for family planning. More than 50% of the demand for family planning was not met. Factors like ethnicity, age of the participant, participant's education, husband's occupation, having discussion about family planning with partner in the last 6 months and gravidity were independent predictors of unmet need for family planning among currently married women. Efforts to be exerted were recommended in order to reduce this high rate of unmet need by focusing on those kebeles which Wolayta and Zeysse tribes live, older age, illiterates and those with high gravidity.

Keywords: unmet need, family planning, cross-sectional, ethiopia, magnitude, associated factors, community based.

I. INTRODUCTION

Unmet need for family planning initially was defined as a group of women who are currently married, not pregnant, and not amenorrheic and who would like to limit their reproduction but not using any contraception (Westoff 1978). Latter it was redefined to include all fecund women who are married or living in union, who are not using contraception and who either do not want to have any more children or want to postpone their next birth for at least two more years and pregnant and amenorrheic women are included to the unmet need group unless their pregnancy or last birth intended (Westoff 1988). But still this is not free from criticisms as it lacks to address certain issues like unmarried women, men, those who use unsuitable, incorrect or unsafe method (traditional methods) etc. (Ngom P 1997, Akadl. and Çavlin. 2005).

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It exists to varying degrees in virtually every developing country. This may be due to inadequate access, lack of knowledge on family planning methods, even where programs already exist and socio demographic & economic factors etc (Johns Hopkins Bloomberg School of public health 2003, EDHS 2011).

For example in a study done in Nepal the extent of unmet need was 25 % with 9.5% for spacing and 15.5% for limiting. There was a strong association of gender preferences towards male child and unmet need (Bhandari, Premarajan et al. 2006). A study done in Kolkata showed that the extent of unmet need for family planning observed was 41.67% of which 25.84% are limiters and 15.83% are spacers (Bhattacharya, Ram et al. 2006). In a study done in south-east Nigeria, 27.5% of the pregnancies were unintended. The prevalence of unmet need was found to be 21.4% with 15.2% for spacing and 6.2% for limiting (Igwegbe., Ugboaja. et al. 2009). In a study in Dar Assalam (Sudan) observed a 30.7% prevalence of unmet need (T. Umbeli, A. Mukhtar et al.).

National and some pocket studies in Ethiopia also showed a varying degree of unmet need for family planning. For example, according to the 2011 Ethiopian Demographic and Health Survey (EDHS 2011) 25% of currently married women have an unmet need for family planning services with 16 % for spacing and 9% for limiting (EDHS 2011). In a study conducted in eastern part of the country (in Harer) showed that, 33% of pregnancies were unwanted (Solomon W and Mengistu F 2006). A study in Northern part of the country indicated that, 59.7% of the nonusers had a desire for family planning (Getnet M 2000). Another study in, North Gondar (Ethiopia), indicated that 39.5% and 47% of women and men have unmet need for contraception, and 29% and 28.5% of women and men have met their need respectively. The minimum and maximum couples' unmet needs for contraception were found to be 29.5% and 57.5%, respectively (Nega Mihret 2008).

Different factors have been identified for the unmet needs by different studies. For instance, a study done in Lesotho showed that, human immune deficiency virus (HIV)-negative women have significantly higher unmet need for contraception than those who were HIV positive (Tim Adair 2007). In the study there

was a strong relationship between wealth quintile and unmet need among both HIV-positive and HIV negative women. A woman whose household is in the fourth quintile or in the highest quintile is much less likely to have an unmet need for contraception compared with those in the lowest quintile. HIV-positive women in the second quintile and HIV-negative women in the middle quintile are also significantly less likely to have unmet need for contraception. Currently married women have greater unmet need for contraception than never-married women. HIV-positive women age 35 and above are far more likely to have unmet need for contraception compared with teenage women, while HIV-negative women age 20-34 have less unmet need (Tim Adair 2007).

In a study done in Kenya, several variables were found to be significantly related to total unmet need. These include women's age, number of living children, secondary or higher level of education, household wealth, current work status, exposure to media messages about family planning, and discussion with the partner about family planning. In the study contact with health services was also significantly related to unmet need for family planning (David Ojaka 2008). In a study done in Turkey, age of the woman, educational level of the woman and residence were found to be determinants of unmet need for family planning (Akadl. and Çavlin. 2005).

In the study done in south-east Nigeria, there was a significant association between parity and unmet need. Age, level of education, religion and husband's occupation had no significant effects (Igwegbe., Ugboaja. et al. 2009). The study conducted in Kolkata showed that, prevalence of unmet need was significantly higher in younger age group. With increase in literacy level prevalence of spacers in the unmet need group had significantly increased and that of limiter decreased. The prevalence of spacers significantly decreased and limiter increased with, increase in numbers of living children. The major reason for unmet need was opposition from husband/ family and community (Bhattacharya, Ram et al. 2006).

Similarly studies conducted in Ethiopia showed that different factors are playing a role for the existence of unmet need and unintended pregnancies. For example, in the study conducted in Harer, among the women who had unintended pregnancies, 70.6% reported the reason as inadequate knowledge, 11.6% as husband or partner approval, 11.1% as failure on the method, and 4.4% as difficulty in accessing contraceptive (Solomon W and Mengistu F 2006). According to the study in West Belesa Woreda, North Gondar, number of living children, spousal communication and discussion with health extension workers about family planning methods were found to be significantly affecting couples unmet need for contraception (Nega Mihret 2008).

A study which used the 2000 EDHS data found that total unmet need was significantly lower among women age 20 and over. In the study the number of living children a woman had was directly related to her demand for family planning services, women with living children were much more likely (about twice) to have an unmet need for family planning than women with no living children. As women's ideal number of children increases, so does their unmet need for spacing. Women in rural areas were more than four times as likely as women in urban areas to have an unmet need for family planning services, with the unmet need for spacing nearly three times higher among rural than urban women. Women's education, ethnicity and spousal discussion were some of variables which were found to significantly affect unmet need for family planning (Korra Antenane 2002).

Even though there are some pocket studies conducted in other parts of the country, there is shortage of evidence in the current study area about the extent of unmet need and their associated factors. As the livelihood of the communities and access to health services are different in different part of the country, the extent of unmet need and their associated factors in the study area expected to be different. Therefore this study was conducted to assess the level of unmet need for family planning and its determining factors among females in reproductive age.

II. METHODOLOGY

a) Study area

The study was conducted in the research sites of Arba Minch Demographic and Health Development Program of Arba Minch University which is based in Arba Minch Zuria Woreda/district. The program was initiated in 2008 in 9 kebeles (lower administrative level in the country) (out of the 27 kebeles of the district) by conducting census of the residents of the kebeles. Arbaminch Zuria Woreda/District is one of the 17 woredas (2 of them are town transition administration) in Gamo Gofa Zone, South Nation and Nationalities People Region (SNNPR). The Woreda surrounds the Arba Minch Town, which is 502km away from the capital of the country (Addis Ababa), in all direction as the name implies with a radius ranges from 17km to 63 km. The woreda uses Arbaminch town as its capital. The woreda is bordered by both Lake Chamo and Abaya at north east, Chench and Dita woreda in the north, Konso and Derashe special woreda in the south, Amaro special woreda in the east and Bonke woreda in the west. The woreda lies on 168,712 square kilometer. According to the 2007 national census report the total population of the woreda to be 165,680 (with 82,751 males and 82,929 female). According to the 2000 E.C. Gamo Gofa Health Department annual report, there were 29468 households in the 29 kebeles of the woreda. Two Health Centers and

two developing health centers and 35 health posts are providing health services to the population of the district.

b) Study design

Community based cross-sectional quantitative study was conducted during 2010.

c) Source population

All females in reproductive age group in Arba Minch Zuria Woreda.

d) Study population

Females in reproductive age in the woreda who were selected using multi stage cluster sampling method.

e) Sampling procedure

All kebeles of Arba Minch Demographic and Health Development Program of Arba Minch University (9 kebeles, which were selected by simple random sampling method out of 27 kebeles in Arba Minch Zuria Woreda) were included in the study. Systematic sampling was applied to select the households (HH) by using the list of all HH of the each Kebele as a sampling frame and a female in reproductive age in the selected HH was interviewed. In case, there were two or more eligible in the selected HH one of them was selected as follow. Priority was given to married women and if more than one married women in the HH one of them was selected using lottery method and if there are no eligible in the selected HH, the next HH was taken.

f) Sample size determination

The required sample size of the study was determined using a formula for a single population proportion: $n = \frac{[Z_{\alpha/2}]^2 p (1-p)}{d^2}$. Where: P= The prevalence of unmet need for family planning, 50%, Z=a standard score corresponding to 95%confidence level (1.96), d= the margin of error (5%) and n=the minimum required sample size. Accordingly, the sample size calculated was 385. Applying design effect of 2 and considering 5% non response rate, the required sample size was 809.

g) Inclusion and Exclusion criteria

Females in the reproductive age group (15-49 years old) who reside in the selected HHs were interviewed. Those who were not in the reproductive age and those who were not volunteer to participate.

h) Data collection

A closed ended structured Amharic questionnaire was utilized for data collection. The questionnaire was developed in English based on literature review and translated in to Amharic, then back to English to check for its consistency. Finally the Amharic version was used for data collection. The questionnaire was pre-tested in one kebele which was not included in the study. The main components of the

questionnaire were: socio demographic and economic characteristics, reproductive characteristics (parity, gravidity, no. of live birth, no. of child etc), knowledge & attitude about family planning etc.

i) Data quality assurance

A carefully designed questionnaire was translated first into Amharic and back to English to assure its consistency. The questionnaire was pre-tested in a kebele, which was not included in the study to assess the clarity of the questions, their sensitiveness as well as understanding of the data collectors. Discussion was held based on the result of the pre-test and accordingly, some amendments were made. A three days training was given to the supervisors and the data collectors on the procedure. The data was checked for completeness, accuracy, clarity, and consistency by the supervisors and the investigators on daily basis. Any error or ambiguity and incompleteness were corrected accordingly. The data was intensively cleaned up before its analysis.

j) Data processing and analysis

The data was entered using Epi-info 2002 version 3.4.2 and analysis was carried out using statistical package for social sciences (SPSS)-16 statistical packages. Mean, median and percentage value of different variables was computed for description as appropriate. Chi-square statistics and odds ratio with 95% confidence interval was computed to assess the presence and degree of association between dependent and independent variables. Furthermore, logistic regression analysis was done to control the possible confounding effect of selected variables. P-value of 0.05 was set as a cut-off point for the significance of the association between dependent and independent variables.

k) Study variables

i. Dependent variables

Unmet need/met need.

ii. Independent variables

Socio-demographic and economic characteristics (age, sex, educational level, ethnicity, religion, monthly income, occupation etc.), reproductive history (parity, gravidity, no. child, history of abortion, still birth etc), knowledge and perception about FP, Discussion about FP with husband, Etc

l) Ethical considerations

Ethical clearance and approval was obtained from the Ethical Committee of the University and letter was written to the woreda/district and respective kebeles and permission was secured at all levels. After explaining about the purpose, the possible benefit of the study and confidentiality, verbal consent was obtained from each respondent. To assure the confidentiality of the response, anonymous interview was conducted.

m) *Operational definitions*

i. *Unmet need for spacing include*

Pregnant women whose pregnancy was mistimed, Amenorrhoeic women who are not using family planning and whose last pregnancy was mistimed or whose last birth was unwanted but now say they want more children, and Fecund women who are neither pregnant nor amenorrhoeic, who are not using any method of family planning and say they want to wait 2 or more years for their next birth. Also included in unmet need for spacing are fecund women who are not using any method of family planning and say they are unsure whether they want another child or not.

ii. *Unmet need for limiting*

Pregnant women whose pregnancy was unwanted, Amenorrhoeic women who are not using family planning, whose last pregnancy was unwanted and who do not want any more children, and Fecund women who are neither pregnant nor amenorrhoeic, who are not using any method of family planning, and who want no more children. N.B. Excluded from the unmet need category are pregnant and amenorrhoeic women who became pregnant while using a method (these women are in need of a better method of contraception).

iii. *Using for spacing*

Women who are using some method of family planning and say they want to have another child or are undecided whether to have another.

iv. *Using for limiting*

Women who are using and who want no more children.

distance from the health institution providing the services (Table1).

III. RESULT

a) *Socio-economic & demographic Characteristics*

A total of 809 female in reproductive age group from nine Kebeles were interviewed with a response rate of 100%. Majority of the respondents 695(85.9%) were currently married, more than half 478 (59.1%) of the respondents were age between 20 and 34 years, with the median age of 29 years. Majority of the respondents 496 (61.3%) were protestants followed by orthodox 265(32.8). Ethnically, majority 630 (77.9%) were Gamo followed by Zeise tribe 69 (8.5%). Five hundred thirteen (63.4%) were illiterate followed by primary education 165 (20.4%). Majority 681(84.2%) were house wives and only 11 (1.4%) were government employees (Table1). Five hundred fifty (79.1%) and 330(47.5%) of the husband's of currently married women were farmer and illiterate respectively. Four hundred sixty six (61%) of the respondents classified their relative income as poor or very poor. Less than half 376 (46.5%) of the respondents had Radio in their household and only 59 (7.3%) of the participants reported to have television set in their household. Five hundred seventy nine (71.6%) of the respondents' resident were within 30minutes walking

Table 1 : Socio economic-demographic characteristics of respondents, Arba Minch Zuria Woreda, 2010

Variables		
Marital status	Freq.(n=809)	Percent
Married	695	85.9
Single	67	8.3
Divorced/Separated	16	2.0
Widowed	31	3.8
Age	Freq.(n=809)	Percent
15-19	108	13.3
20-24	152	18.8
25-29	178	22.0
30-34	148	18.3
35-39	118	14.6
40-44	64	7.9
45-49	41	5.1
Religion	Freq.(n=809)	Percent
Protestant	496	61.3
Orthodox	265	32.8
Muslim		.5
Others	44	5.4
Ethnicity	Freq.(n=809)	Percent
Gamo	630	77.9
Gofa	15	1.9
Wolayita	48	5.9
Zeise	69	8.5
Amhara		.7
Ganjule	15	1.9
Other	26	3.2
Educational status	Freq.(n=809)	Percent
Illiterate	513	63.4
Read and write	28	3.5
Grade 1 to 6	165	20.4
Grade 7 to 8	58	7.2
Grade 9 to 12	39	4.8
Above grade 12		.7
Occupation	Freq.(n=809)	Percent
farmer	17	2.1
house wife	681	84.2
gov't employee	11	1.4
merchant	22	2.7
jobless		1.1
house maid		.7
student	33	4.1
others	15	1.9
daily laborer	15	1.9

Husband Occupation	Freq.(n=695)	Percent
farmer	550	79.1
daily laborer	43	6.2
merchant	36	5.2
Government employee	22	3.2
Student	15	2.2
others	29	4.2
Relative income	Freq.(n=809)	Percent
very poor	257	31.8
poor	236	29.2
medium	230	28.4
rich	49	6.1
I can't say	31	3.8
no response	6	.7
Have radio in the house	Freq.(n=809)	Percent
No	433	53.5
Yes	376	46.5
Have television in the house	Freq.(n=809)	Percent
No	750	92.7
Yes	59	7.3
Walking distance of the sources of health services	Freq.(n=809)	Percent
<15 minutes	375	46.4
15-30 minutes	204	25.2
31-60minutes	131	16.2
61-120minutes	75	9.3
>120minutes	24	3.0

b) Reproductive history and other characteristics of the respondents

Of 742 ever married women 572 (77.1%) mentioned/remembered age at first marriage of whom 231(40.4%) got married before their 18th birth date. Age at first marriage was ranging from 13 to 26 years with median and mode age of 18years. Majority 724 (89.5%) of the respondents reported to be ever pregnant. Among currently married women 674(97.0%) were ever pregnant at the time of the survey (Table2). Ninety (11.1%) of the total respondents were pregnant at the time of the survey. Except one all of them were married at the time of the survey. Eighty (20.0%) of the current pregnancy were mistimed or unwanted. I thought I couldn't be pregnant 9(50%) and I don't know about family planning methods 4(22.2%) were the commonly mentioned reasons for the failure to avoid these mistimed and unintended pregnancies. Only one woman reported method failure as the reason for unintended pregnancy. One hundred thirty eight (17.1%) and 134(19.3%) of all women and currently married women gave birth within 6 months prior to the survey, respectively. 28(20.0%) of the pregnancy for these births were mistimed or unwanted. I thought I couldn't

be pregnant 8(28.6%); I don't know about family planning methods 4(14.3%) and husband/partner disapproval were the commonly mentioned reasons for not preventing these mistimed and unintended pregnancies (Table2). To assess birth interval the gap between preceding live births and the current pregnancy or the pregnancy for live births within 6 months prior to the survey were entertained. Accordingly, 32 (13.9%) of women became pregnant within 24 months after the preceding live birth. Of those women who reported to be ever pregnant 539 (74.5%) reported/remembered their age at first pregnancy of whom 162 (30.1%) got pregnant for the first time before age of 18 years. Age at first pregnancy was reported as early as 14years and as late as 29 years with a median age of 19 years. Three hundred seven (37.9%) and 262 (32.4%) of the women were grand multi gravida (>=5 pregnancy) and grand multi parous (>=5 births), respectively. Among those who reported to be ever pregnant 123(17.0%), 29 (4.0%) and 264 (36.5%) reported ever history of abortion, still birth and child death, respectively. Among 724 women who reported to be ever pregnant 446(61.6%) had at least 3 live children at the time of the study (Table2). Eighteen (2.2%) of all women and 13(1.9%) of currently

married women want as many children as possible. The mean (standard deviation) ideal number of children wanted was 5.3(1.6) with the range of 11-2 children. The median numbers of male and female children wanted were 3 and 2, respectively. Out of the total participants

only 338 (41.8%) have discussed about family planning with her husband/partner during the 6 months prior to the survey. Five hundred thirty four (66.0%) of the respondents know at least two modern contraceptive methods.

Table 2 : Reproductive history and other characteristics of respondents, Arba Minch Zuria Woreda, 2010

Variable	Frequency	Percent
Ever be pregnant	(n=809)	
No	85	10.5
Yes	724	89.5
Age at 1st pregnancy	Frequency (n=724)	Percent
<18years	162	22.4
18-29	377	52.1
Not remember/no response	185	25.6
Currently pregnant	Frequency (n=809)	Percent
No	634	78.4
Yes	90	11.1
Never pregnant	85	10.5
Classification of the current pregnancy	Frequency (n=90)	Percent
Wanted	72	80.0
Wanted but miss timed	15	16.7
Unwanted	3	3.3
Gave birth with in 6months prior to the survey	Frequency (n=809)	Percent
Yes	140	17.3
No	497	61.4
Never pregnant/ currently pregnant/no response	172	21.3
Classification of the pregnancy for the birth in 6months prior to the survey	Frequency (n=140)	Percent
Wanted	112	80.0
Wanted but miss timed	22	15.7
Unwanted	6	4.3
No. of months since the preceding birth and the current pregnancy or pregnancy of the birth within the last 6months	Frequency (n=230)	Percent
1 st pregnancy/no response	58	25.2
<24	32	13.9
24-36	101	43.9
>36	39	14.0
Age at first pregnancy	Frequency(n=539)	Percent
<18	162	30.1
18-35	377	69.9
Number of pregnancies (Gravidity)	Frequency(n=809)	Percent
1-2	210	26.0
3-4	207	25.6
>5	307	37.9
None(0)	85	10.5
No. of birth(Parity)	Frequency(n=809)	Percent
1-2	217	26.8
3-4	218	26.9
>5	262	32.4
None/no response	112	13.8
Ever abortion	Frequency(n=809)	Percent
No	601	74.3

Yes	123	15.2
Never pregnant	85	10.5
Ever still birth	Frequency(n=809)	Percent
No	695	85.9
Yes	29	3.6
Never pregnant	85	10.5
Child death	Frequency(n=809)	Percent
No	460	56.9
Yes	264	32.6
Never pregnant	85	10.5
Number of live children	Frequency(n=809)	Percent
1-2	253	31.3
3-4	248	30.7
>=5	198	24.5
No live child	110	13.6
Want more child		Percent
Yes	497	71.5
No	167	24.0
Unsure	30	4.3
No response	1	0.1
Discussed with partner about family planning in the last 6 month	Frequency(n=809)	Percent
No response	11	1.4
yes	338	41.8
No	391	48.3
No partner	69	8.5
Have Knowledge about modern contraceptive methods(>=two methods)	Frequency (n=809)	Percent
Yes	534	66.0
No	275	34.0

c) *Unmet need for family planning methods*

Out of the 809 participants 229(28.3%) were current users, almost all 227(99.1%) were currently married. Eventually, 227(32.7%) of currently married women were current users of any method at the time of the survey, 172(24.7%) for spacing and 54(7.8%) for limiting and one woman was using to regulate her menstruation. The overall unmet need for all women was 41.5% with 27.6% for spacing and 14% for limiting. Among currently married women 239 (34.4%) have unmet need for family planning with 157(22.6%) for spacing and 82(11.8%) for limiting. Eighteen (20.0%) of the current pregnancy were mistimed or unwanted. I thought I couldn't be pregnant 9(50%) and I don't know about family planning methods 4(22.2%) were the commonly mentioned reasons for the failure to avoid these mistimed and unintended pregnancies. Only one woman reported method failure as the reason for unintended pregnancy. One hundred thirty eight (17.1%) and 134(19.3%) of all women and currently married women gave birth within 6 months prior to the survey, respectively. Twenty eight (20.0%) of the pregnancy for these births were mistimed or unwanted. I thought I couldn't be pregnant 8(28.6%) and I don't know about family planning methods 4(14.3%) were the commonly mentioned reasons for not preventing these mistimed and unintended pregnancies.

d) *Factors associated with unmet need for family planning among currently married women*

In the univariate analysis among the socioeconomic-demographic variables ethnicity, age of the participant, participant's education, husband's occupation, husband education and walking distance of source of services were the factors which are associated with unmet need for family planning among currently married women (Table3). Among other variables only having discussion about family planning with partner in the last 6 months, experience of child death and gravidity were the factors which are associated with unmet need for family planning among currently married women (Table4). After controlling other variables among the socioeconomic-demographic variables only ethnicity, age of the participant, participant's education, husband's occupation maintained their association with unmet need for family planning (Table3). Among other variables only having discussion about family planning with partner in the last 6 months and gravidity maintained their association with unmet need for family planning after controlling other confounders (Table4). Accordingly, Wolayita and Zeze tribes found to be about 2.3 times (Adjusted odds ratio (AOR) =2.303(1.016-5.222)) and 2.7 times (AOR= 2.674(1.479-4.835)), respectively, more likely to have unmet need than Gamo tribe. Respondents whose age

is ≥ 35 years were 2.6 times (AOR=2.618(1.591-4.308)) more likely to have unmet need than respondents whose age was between 15-24 years. Participants whose education was in grade 1-8 (AOR=.574(.357-.923)) and above grade 9(AOR=.158(.039-.645)) were less likely to have unmet need than those who were illiterate (Table3). Participants whose husbands were government employee were found to be 4 times more likely to have unmet need than

those whose husband were farmers, with AOR (4.077(1.247-13.329)) (Table3). Participants who didn't have experience of discussion about family planning with their partner in the last 6 months found to have unmet need of about 3 times (AOR=2.591(1.708-3.931)) than their counterparts. Participants whose gravidity was ≥ 5 were about 3 times (AOR=3.398(1.821-6.342)) more likely to have unmet need than those with gravidity of ≤ 2 (Table4).

Table 3 : Association between socioeconomic and demographic and economic variables and unmet need for family planning among currently married women, Arbaminch Zuria Woreda, 2010

Variables	Unmet need for FP		Crude odds ratio (COR) (95% CI)	*AOR(95%CI)
	Yes(No. (%))	No(No. (%))		
Ethnicity(n=695)				
Gamo	16(14.4)	95(85.6)	1.00	1.00
Zeyse	4(25.0)	12(75.0)	2.303(1.370-3.872)	2.674(1.479-4.835)
Wolayita	1(33.3)	2(66.7)	2.021(1.058-3.859)	2.303(1.016-5.222)
Others	2(20.0)	8(80.0)	1.489(.822-2.698)	1.633(.824-3.235)
Age(n=695)				
15-24	47 (24.6)	144(75.4)	1.00	1.00
25-34	91(29.4)	218(70.6)	1.279(.849-1.927)	.968(.612-1.533)
≥ 35	101(51.8)	94(48.2)	3.292(2.135-5.075)	2.618(1.591-4.308)
Religion(n=695)				
Protestant	146(34.4)	279(65.6)	1.00	1.00
Orthodox	79(34.2)	152(65.8)	.993(.709-1.392)	.928(.627-1.372)
Others	14(35.9)	25(64.1)	1.070(.540-2.121)	.978(.461-2.072)
Participant's Education(n=695)**				
Illiterate	179(39.8)	271(60.2)	1.00	1.00
Read and write	12(46.2)	14(53.8)	1.298(.587-2.870)	1.570(.650-3.794)
Grade 1 to 8	45(23.8)	144(76.2)	.473(.322-.695)	.574(.357-.923)
Grade 9 &above	3(10.0)	27(90.0)	.168(.050-.563)	.158(.039-.645)
Occupation of the participant(n=695)				
house wife	224(34.6)	423(65.4)	1.00	1.00
Others	15(31.2)	33(68.8)	.858(.456-1.614)	1.235(.587-2.598)
Husband Occupation (n=695)				
farmer	195(35.5)	355(64.5)	1.00	1.00
daily laborer	11(25.6)	32(74.4)	.626(.309-1.269)	.772(.335-1.777)
merchant	8(22.2)	28(77.8)	.520(.233-1.163)	.850(.346-2.088)
Government employee	13(59.1)	9(40.9)	2.630(1.104-6.262)	4.077(1.247-13.329)
Student	2(13.3)	13(86.7)	.280(.063-1.254)	.798(.148-4.319)
others	10(34.5)	19(65.5)	.958(.437-2.102)	1.455(.579-3.657)
Husband Education(n=695)				
1=Illiterate	127(38.5)	203(61.5)	1.00	1.00
2=Read and write	24(47.1)	27(52.9)	1.421(.785-2.571)	1.316(.672-2.578)
3=Grade 1 to 6	58(32.4)	121(67.6)	.766(.522-1.124)	1.009(.638-1.595)
4=Grade 7 to 8	18(27.7)	47(72.3)	.612(.340-1.101)	.891(.425-1.868)
5=Grade 9 and above	12(17.1)	58(82.9)	.331(.171-.640)	.632(.244-1.636)
Relative family income(n=695)				
very poor	72(33.5)	143(66.5)	1.00	1.00
poor	66(32.2)	139(67.8)	.943(.627-1.417)	.721(.456-1.141)
medium	69(33.7)	136(66.3)	1.008(.672-1.511)	.881(.549-1.413)
rich	20(48.8)	21(51.2)	1.892(.963-3.714)	1.682(.772-3.663)
Can't classify	12(41.4)	17(58.6)	1.402(.635-3.093)	1.525(.644-3.610)
Have Radio in the house(n=695)				
Yes	102(31.0)	227(69.0)	1.00	1.00

No	137(37.4)	229(62.6)	1.331(.971-1.825)	1.215(.824-1.791)
Walking distance of source of services (n=695)				
<15minutes	96(31.6)	208(68.4)	1.00	1.00
15-30minutes	63(34.2)	121(65.8)	1.128(.765-1.664)	1.106(.715-1.711)
31-60minutes	49(41.9)	68(58.1)	1.561(1.006-2.424)	1.351(.824-2.215)
>60minutes	31(34.4)	59(65.6)	1.138(.692-1.872)	1.013(.576-1.781)

*Adjusted for all variables listed above

** Adjusted for all variables listed above except husband education

Table 4 : Association between unmet need for family planning and other selected variables among currently married women, Arbaminch Zuria Woreda, 2010

Variables	Unmet need for FP		COR(95% CI)	**AOR(95%CI)*
	Yes(No. (%))	No(No. (%))		
Discussion in last 6 months(n=695)				
Yes	75(22.5)	256(77.5)	1	
No	164(45.4)	197(54.6)	2.875 (2.067-3.99)	2.591(1.708-3.931)
Have Knowledge about modern contraceptive methods(>=two methods) (n=695)				
Yes	158(34.1)	306(69.9)	1	
No	81(35.1)	150(64.9)	1.046(0.751-1.457)	.961(.621-1.486)
Number of live Children (n=650)				
<=2	7(24.1)	22(75.9)	1	
3-4	60(28.4)	151(71.6)	1.249(0.507-3.076)	1.183(.333-4.194)
>=5	172(37.8)	283(62.2)	1.910(0.799-4.566)	1.165(.336-4.041)
Ever Abortion (n=695)				
Yes	45(39.1)	70(60.9)	1	
No	187(33.5)	372(66.5)	0.782(0.517-1.183)	.973(.540-1.753)
Ever Stillbirth (n=695)				
Yes	10(34.5)	19(65.5)	1	
No	222(34.4)	423(65.6)	0.997(0.456-2.181)	.959(.362-2.545)
Child Death (n=695)				
Yes	106(44.4)	133(55.6)	1	
No	126(29.0)	309(71.0)	0.512(0.368-0.711)	1.263(.766-2.081)
Gravidity (n=695)				
<=2	51(23.7)	164(76.3)	1	
3-4	55(27.8)	143(72.2)	1.237(0.795-1.924)	1.265(.720-2.221)
>=5	133(47.3)	148(52.7)	2.890(1.953-4.276)	3.398(1.821-6.342)
Age at first pregnancy (n=504)				
<18 years	42(28.4)	106(71.6)	1	
>=18years	119(33.4)	237(66.6)	1.267(0.833-1.928)	1.338(.841-2.128)

** Adjusted for all variables listed above

IV. DISCUSSION

As explained before, women who say they are not using contraception and who say either that they do not want any more children or that they want to wait two or more years before having another child and those mothers whose pregnancy is unintended are considered to have an unmet need for family planning. Conversely, women using a family planning method are said to have a met need for family planning. Both unmet and met needs are categorized as such based on whether the need is for spacing or limiting births. The combination of women with unmet need and women with met need for family planning constitutes the total demand for family planning (EDHS 2011).

In the current study the overall unmet need for family planning was 41.5%. It was relatively lower among

currently married women that 34.4% of currently married women had unmet need for family planning at the time of the survey. About 32.7% of currently married women's need for family planning was met. Accordingly, 67.1% of currently married women had a demand for family planning. More than 50% of this demand was not met. The unmet need was 157(22.6%) for spacing and 82(11.8%) for limiting.

The unmet need in the current study is relatively higher than that of studies conducted in Nigeria and Sudan (T. Umbeli, A. Mukhtar et al. , Igwegbe., Ugboaja. et al. 2009). But is lower than that of the study conducted in India (Bhattacharya, Ram et al. 2006). When we compare it with the latest national prevalence of EDHS 2011 it is higher (EDHS 2011). But it is relatively lower than that of a study conducted in the Northern part of the country (Nega Mihret 2008). These differences

might be because of the differences in the access to health services and awareness level of the communities. Anyways the current finding can be an alert for efforts to be exerted in order to address this unmet need. Like that of EDHS2011 result (EDHS 2011) and the finding of other study (Igwegbe., Ugboaja. et al. 2009), majority of the unmet needs were for spacing. However, the 11.8% of unmet need for limiting is a good indicator for the requirement of focusing on long acting contraception especially permanent ones too.

In the current study 20.0% of the current pregnancies were mistimed or unwanted. This is relatively lower than the findings of studies conducted in eastern part of the country and in Nigeria that 33% and 27.5%, respectively, of the study participants reported their pregnancies were unintended. This may be attributed to increased awareness, access to information, education and communication and family planning services as a result of the increased effort of expansion of health extension program in recent times in the country compared to when the time the previous studies were conducted. This was partly demonstrated by the current study that, all the kebeles included in the study has a health post with at least one health extension workers. However the 20% of unintended pregnancy in a community with 100% coverage of health extension program may be surprising and an alert to work hard in rechecking and investigating service provision strategies' of the program and intensifying awareness creation activities as 22.2% of these unintended pregnancies were because of lack of awareness about family planning methods.

A basic knowledge of the physiology of reproduction is especially useful for the successful practice of coitus-related methods such as periodic abstinence. The successful use of such methods depends in a large part on understanding when during the ovulatory cycle a woman is most likely to conceive (EDHS 2011). This may also help the woman think of all possible family planning methods in order to avoid the pregnancy if she doesn't need it. In the current study half of the unintended pregnancies were occurred because the women were thinking that they couldn't be pregnant. This may be an alert for giving attention to the physiology of reproduction during information, education and communication programs on family planning rather than merely focusing on the types of family planning methods.

Wolayita and Zeysse tribes found to be about 2.3 times and 2.7 times, respectively, more likely to have unmet need than Gamo tribe. This may help the woreda/district health office in focusing on kebeles with these tribes and in preparing health messages appropriate to the language and culture of these tribes in the woreda. Besides, there may be a requirement for investigating why these tribes have more unmet need

than the Gamo tribe. Respondents whose age is ≥ 35 years were 2.6 times more likely to have unmet need than respondents whose age was between 15-24 years. Similar finding was observed in other studies (Tim Adair 2007, David Ojaka 2008). This may be because as the age of the mother increases she might have more children and might want to limit or postpone her pregnancy. Contrasting findings were observed in other studies done in Ethiopia and India (Korra Antenane 2002, Bhattacharya, Ram et al. 2006) that prevalence of unmet need was significantly higher in younger age group. However, there was no association between age and unmet need for family planning in a study done in Nigeria (Igwegbe., Ugboaja. et al. 2009). These varying findings may be because of the difference in the background of the study participants of the different studies.

Participants whose education was in grade 1-8 and in grade 9 or above were less likely to have unmet need than those who were illiterate. Similarly educational status of the woman shown to be negatively associated with unmet need for family planning in different studies (Korra Antenane 2002, Akadl. and Çavlin. 2005, David Ojaka 2008). In this study, unexpectedly participants whose husbands were government employee were found to be 4 times more likely to have unmet need than those whose husband were farmers. This may be because of the small number of participants in this category, only 3.2% of the participants' husbands were government employee, whereas 79.15% of the participants' husbands were farmers. Husband's occupation was found to have no significant effects on unmet need in a study conducted in Nigeria (Igwegbe., Ugboaja. et al. 2009).

Participants who didn't have experience of discussion about family planning with their partner in the last 6 months found to have unmet need of about 3 times than their counterparts. Similar finding was observed by other studies (Korra Antenane 2002, Amaha H and Fikru E 2006, Nega Mihret 2008, David Ojaka 2008). This may show the importance of involvement of men in family planning programs and show the importance of enhancing spousal communication on family planning methods. Participants whose gravidity was ≥ 5 were about 3 times more likely to have unmet need than those with gravidity of ≤ 2 . This may be due to the fact that, mothers with high number of pregnancy tend to be older and have unmet need as observed by this study.

V. CONCLUSION AND RECOMMENDATION

There was high prevalence of unmet need in the study area as more than 50% of the demand for family planning of currently married women was not met. Variables like ethnicity, age of the participant,

participant's education, husband's occupation, having discussion about family planning with partner in the last 6 months and gravidity were independent predictors of unmet need for family planning among currently married women. Accordingly efforts should be exerted in order to reduce this high rate of unmet need for family planning by focusing on those kebeles which Wolayta and Zeze tribes live, older age, illiterates and those with high gravidity. The mothers should be encouraged to discuss about family planning with their partners during family planning counseling and dissemination of family planning messages.

VI. ACKNOWLEDGEMENTS

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Study of Serum Magnesium in Type 2 Diabetes Mellitus and its Correlation with the Modality of Treatment- A South Indian Study

By Mohamed Murtuza Kauser, Asfia Afreen, Prabhakar K,
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Abstract- Introduction: Hypomagnesaemia has been reported to occur with increased frequency in patients with type 2 diabetes mellitus; it is frequently overlooked and undertreated.

Materials and Methods: A total of 50 patients with type 2 Diabetes Mellitus were recruited from the institute's medicine department. Fifty age and sex matched apparently healthy individuals with normal plasma glucose and with no symptoms suggestive of Diabetes mellitus were taken as controls. Both cases and controls were subjected to estimation of biochemical parameters.

Objectives: The present study was conducted with an objective to evaluate the serum magnesium and fasting blood glucose in type 2 Diabetes mellitus cases and compare them with controls. The present study also attempts to evaluate the possible relationship between the modality of treatment and serum magnesium levels.

Results: There is significant difference between levels of serum magnesium levels among diabetics and controls. The mean serum magnesium levels in cases and controls are 1.67 mg/dl and 2.03 mg/dl respectively ($p < 0.001$). The mean serum magnesium levels in the OHA group, insulin group and the insulin+ OHA group were 2.02 mg/dl, 1.59mg/dl and 1.25 mg/dl respectively.

Keywords: *diabetes mellitus, insulin, OHA, hypomagnesemia.*

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Conclusion: The serum magnesium levels were significantly lower in the insulin treated group compared to the OHA treated group. The serum magnesium levels were also significantly lower in insulin treated group compared to the OHA group.

Keywords: diabetes mellitus, insulin, OHA, hypomagnesemia.

I. INTRODUCTION

Type 2 diabetes mellitus is metabolic and endocrinological disease characterised by hyperglycemia associated with both insulin resistance and defective insulin secretion¹. Type 2 Diabetes mellitus accounts for approximately 90-95% of all diagnosed cases of diabetes². In addition to hyperosmolar coma and ketoacidosis, patients with type 2 diabetes mellitus may have cardiovascular disease, nephropathy, retinopathy and polyneuropathy³.

Magnesium is the fourth most abundant cation in the human body and the second most abundant intracellular cation⁴. It plays an important role in the

carbohydrate metabolism. It serves as a cofactor for all enzymatic reactions that require kinases⁵. It is also an essential enzyme activator for neuromuscular excitability and cell permeability, a regulator of ion channels and mitochondrial function, a critical element in cellular proliferation and apoptosis, and an important factor in both cellular and humoral functions⁶.

The treatment of the patients of type 2 diabetes mellitus requires a multidisciplinary approach whereby every potential complicating factor must be closely monitored and treated. In particular although hypomagnesaemia has been reported to occur with increased frequency in patients with type 2 diabetes mellitus, it is frequently overlooked and undertreated⁷.

The present study was conducted with an objective to evaluate the serum magnesium and fasting blood glucose in type 2 Diabetes mellitus cases and compare them with controls. Very few studies have evaluated the relationship between serum magnesium and modality of treatment in type 2 diabetes mellitus. The present study also attempts to evaluate the possible relationship between the modality of treatment and serum magnesium levels.

II. MATERIALS AND METHODS

The study was approved by the Ethics committee; a written informed consent was obtained from all participants in this study. A total of 50 patients with type 2 diabetes mellitus were recruited from the institute's medicine department. The diagnosis of type 2 diabetes mellitus was confirmed by biochemical investigations as per WHO criteria⁸. Fifty age and sex matched apparently healthy individuals with normal plasma glucose and with no symptoms suggestive of DM were taken as controls.

Patients with acute or chronic diarrheal/malabsorption states, with thyroid or adrenal dysfunction, history of alcohol intake, history of vitamin or mineral supplements in the recent past, recent metabolic acidosis, pregnancy, lactation, with serum creatinine > 1.5 mg/dl and on drugs known to affect magnesium levels were excluded from the study⁹.

Both cases and controls were subjected to estimation of biochemical parameters. Fasting plasma glucose was estimated by using commercially available

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kit in automated analyzer. Magnesium was estimated by a kit that uses calmagite dye method¹⁰. The reference serum magnesium level by this method is 1.6-2.5 mg/dl.

III. STATISTICAL ANALYSIS

Statistical analysis of data was performed using SPSS (Version 15.0). Chi-square and Fisher Exact test has been used to find the significance of proportion of serum magnesium levels between cases and controls. Student t test has been used to find the significance of mean pattern of serum magnesium between cases/controls and Insulin/OHA.

IV. RESULTS

A Comparative study consisting of 50 Diabetic Mellitus patients and 50 controls was undertaken to investigate the change pattern of serum magnesium in DM cases when compared to controls. The mean age of the diabetics was 55.42±12.65 years whereas it was 55.58±12.84 years respectively. Both among the cases and controls the sex distribution was same i.e. 62% and 38% males and females respectively. The maximum number of patients was in the age group of 41-50 i.e. 42%.

The mean FBS levels among cases and controls were 230.1 mg/dl and 99.42 mg/dl respectively. There is significant difference between levels of serum magnesium levels among diabetics and controls. The mean serum magnesium levels in cases and controls are 1.67 mg/dl and 2.03 mg/dl respectively ($p < 0.001$).

Of the total of 50 diabetic patients 25(50%) were on insulin alone, 16(32%) were on OHA'S and 9(18%) were on combination of OHA'S and insulin. The mean serum magnesium levels in the OHA group, insulin group and the insulin+ OHA group were 2.02 mg/dl, 1.59mg/dl and 1.25 mg/dl respectively. The serum magnesium levels were significantly lower in the insulin treated group compared to the OHA treated group.

Infections were the most common cause for admission accounting for 54% of the admissions among diabetics. The next commonest cause for admission was cardiovascular disease which accounted for 16% of the admissions. Of these 50% were on insulin, 37.5% on OHA's and 12.5% on OHA's and insulin both. Of the cardiovascular disease 3 patients were admitted for stable angina, 3 for unstable angina and 2 for myocardial infarction. Neurological problems accounted for 12% of admissions. 4 patients admitted for stroke, 1 for cranial nerve palsy and 1 for peripheral neuropathy. Peripheral vascular disease accounted 12% of admissions. 4 patients had ischemic signs in the limbs and 2 patients had gangrene. 6% of patients were admitted exclusively for poorly controlled diabetes.

V. DISCUSSION

Of all the endocrine and metabolic disorders associated with magnesium deficiency, diabetes mellitus is the most common. Many studies have shown that plasma levels are lower in patients with type 1 and type 2 diabetes mellitus compared with non diabetic control subjects. Inverse correlations between magnesium and fasting plasma glucose, HbA1C, HOMA-IR have been observed.^{11, 12}

Factors implicated in hypomagnesemia in diabetics include diets low in magnesium¹³, osmotic diuresis causing high renal excretion of magnesium, insensitivity to insulin affecting intracellular magnesium transport and thereby causing increased loss of the extracellular magnesium¹⁴ rampant use of loop and thiazides diuretics promoting magnesium wasting,^{15, 16} diabetic autonomic neuropathies⁴ and reduced tubular reabsorption due to insulin resistance¹⁷. Sometimes the more common use of antibiotics and antifungals such as aminoglycosides and amphotericin in patients with diabetes may also contribute to renal magnesium wasting¹⁸.

Hypomagnesemia may be a contributing factor for the long term complications particularly ischemic heart disease¹⁹, retinopathy^{20, 21}, foot ulcer²² and peripheral neuropathy²³. In our study there was significant decrease in serum magnesium level in type 2 DM as compared to controls. Similar such decreased in serum magnesium level in diabetic patients as compared to controls has been reported in other studies.^{24, 25}

Our study also demonstrated that serum magnesium levels were significantly lower in patients on insulin treatment compared to patients who were on oral hypoglycaemic agents alone.

VI. CONCLUSION

Hypomagnesemia, defined herein as having low serum magnesium concentrations, is common among patients with type 2 diabetes. Contributory mechanisms most likely are multifactorial. Because available data suggest that adverse outcomes are associated with hypomagnesemia, it is prudent that routine surveillance for hypomagnesemia is done and the condition be treated whenever possible.

A magnesium rich diet consisting of whole grains legumes, fruits and vegetables such as spinach, okra, dry apricots may be recommended. Further studies on the role of magnesium supplementation in type 2 DM in the Indian population are recommended.

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Table 1 : Effect of DM on Serum magnesium

Serum Magnesium	Cases	Controls
Range (Min-Max)	1.0-2.50	1.50-2.60
Mean ± SD	1.67±0.37	2.03±0.25
95% CI	0.052-1.56	0.04-1.96
Significance	Student t=5.649, P<0.001	

Table 2 : Comparison of serum Magnesium levels between cases and Controls

Serum Magnesium	Cases (n=50)		Controls (n=50)	
	Number	%	Number	%
≤ 1.0	1	2.0	-	-
1.0-1.50	19	38.0	1	2.0
1.50-2.00	21	42.0	31	62.0
2.00-2.50	9	18.0	16	32.0
>2.50	-	-	2	4.0
Inference	Cases are significantly more likely to have less Serum magnesium (<1.50 mg/dl) when compared to Controls with P<0.001			

Table 3 : Effect of type of treatment on Serum magnesium

Serum Magnesium	Insulin (n=34)	OHA (n=16)
Range (Min-Max)	1.0-2.20	1.60-2.50
Mean ± SD	1.50±0.27	2.02±0.29
95% CI	1.41-1.60	1.86-2.18
Significance	Student t=5.988, P<0.001	

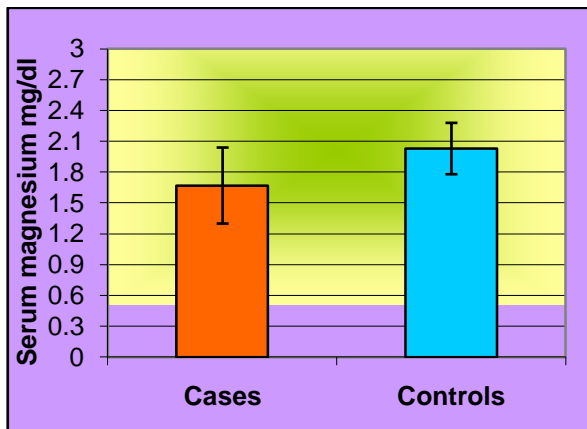


Figure 1

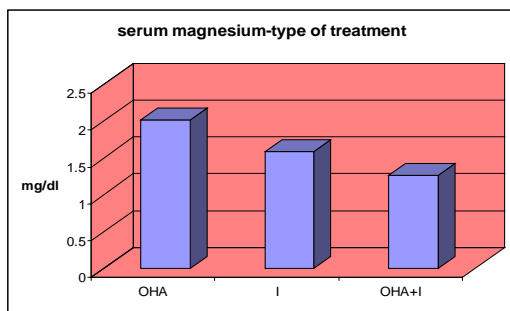


Figure 2

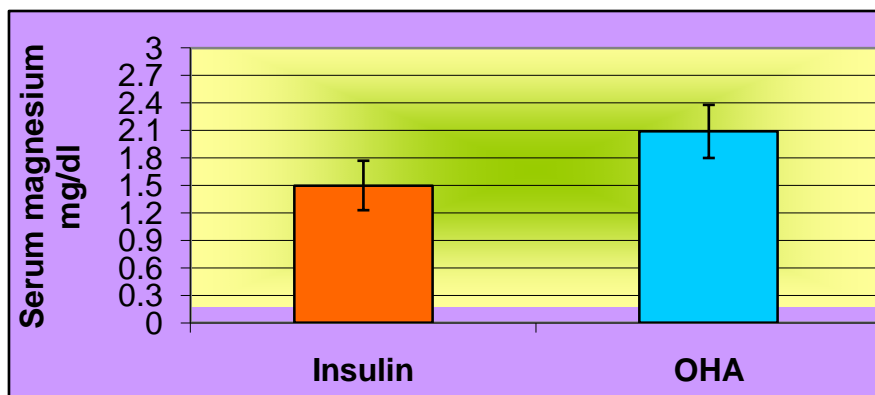


Figure 3



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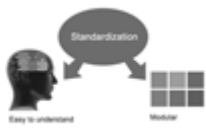
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33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.



Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

- Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

- Use standard writing style including articles ("a", "the," etc.)
- Keep on paying attention on the research topic of the paper
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- Align the primary line of each section
- Present your points in sound order
- Use present tense to report well accepted
- Use past tense to describe specific results
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- Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.



Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript-- must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for brevity. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As an outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
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- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

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The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

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- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.



- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
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Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently. You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.



Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
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- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.



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<i>Methods and Procedures</i>	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
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<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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