Introduction

Dental caries is the most prevalent oral disease among children. This disease not only damages the tooth, but is also responsible for several morbid conditions of the oral cavity and other systems of the body. The prevalence of caries is declining in developed countries due to improved oral hygiene practices and several preventive programs, but is still increasing in developing countries and is an epidemic in countries with emerging economies.[1]

Dental caries in infants and toddlers is collectively known as early childhood caries (ECC). ECC is defined as the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth

in a child 71 months of age or younger.[2] ECC is the most widespread chronic disease in children. [3]

Many factors contribute to ECC. These factors are grouped into four groups; behavioral which include sugar intake, food practices, night time bottle feeding, and frequent breastfeeding; socio-economic factors including family income, education level of the parents, and minority status, and clinical risk factors including biological factors like cariogenic bacteria levels, and the level of caries activity of the mother. . Also, other clinical factors such as the presence of plaque, and enamel defects would contribute to faster progression of ECC.[4]

Early Childhood Caries has serious short and long term consequences that can affect the child's physical and psychological wellbeing. These include manifestations such as pain, infection, speech and communication problems, poor nutrition, reduced productivity, poor quality of life, both in childhood and adulthood. It also creates a financial burden for parents.[4] Hence there is a need to develop various caries preventive programs to interrupt the disease process.

The caries preventive program need an individualized approach which can and should be started right from the prenatal period through infancy to adolescence and even further. It thus includes measures such as:[5]

- Infant oral health care
- Parent counseling, diet counseling
- Fluoride programs
- Pit and fissure sealant and

- Other methods on the horizon

As stated above Infant oral health care [IOHC] is the foundation upon which preventive education and dental care must be built,[6]. And mothers are decision makers and play an important role in achieving the best oral health outcomes for their young children. A young child's dental environment is complex because their mother's and/or caregiver's dental knowledge, attitudes, and practices affect the child's oral condition.[7]It is difficult for expectant mothers to comprehend the issues like timing of the child's first dental visit, what is a healthy diet for teeth, how to and how often to brush the child's teeth, and what to expect when primary teeth start erupting. Hence, it is important to educate the mother right through the pragnacy.[8]

Effective oral health education is dependent on the readiness of the individual to accept new knowledge and their motivation to change existing behaviors. Assessments of parental readiness to change is useful in planning how to communicate with the parent about problematic parenting behaviors.[9] The concept of 'readiness for change' can be explored using the RAPIDD (Readiness Assessment of Parents Concerning Infant Dental Decay) instrument. 'Readiness for change' can be defined as a person's current thoughts, feelings, and attitudes regarding their intention to institute a change in their habits'. Weinstein and Riedy validated a scale - RAPIDD which assessed parent's readiness or stage of change concerning infant dental decay. The scale is based on 4 constructs: valuing dental health, permissiveness with oral health, convenience and change difficulty and openness to information.[10]

Traditional health education like oral health education lectures or booklets is the answer for the parents of children of developing caries who are at high risk.

However, it is seen that traditional health education is insufficient to change parent's behavior in relation to their at-risk children.[11] Hence, a new behaviour change technique was used i.e. Motivational interviewing [MI]

Motivational interviewing is a relatively new and promising therapeutic approach that integrates the relationship-building principles of humanistic therapy with more active cognitive– behavioral strategies which are targeted to the client's stage of change.[12] It can be defined as a client-centered yet directive method for enhancing intrinsic motivation to change by exploring and resolving client ambivalence.[10]

The Commonwealth Fund 2003 Survey of Physicians and Quality of Care found that one-fourth of primary care physicians incorporate patient-centered approaches in their practices. Motivational Interviewing (MI) has been adapted to achieve various health-enhancing objectives (e.g., dietary change). While the choice of health goals, training of interventionists, professional role of the interventionists, number of patient contacts, and duration of sessions may vary in MI techniques but reflects a common value of patient-centeredness.[13]

Nagraj A and Pareek S. [2012], Ramos G M et al.[2014],Thomas A et al.[2015] Almoudi M M et al.[2016] [13,14,15,16] did similar studies regarding expectant women's knowledge, attitude and practice of infant oral health and concluded that it is necessary to implement a strategy focused on oral health care for expectant women, because during pregnancy the woman is more receptive to new information and

change her oral hygiene practices that , in turn , will reflect in promotion of their children's oral health.

To the best of our literature search, no study have assessed the KAP of expectant mothers and the impact of Motivational interviewing on KAP of expectant mothers of central India. Hence, the present study was formulated to evaluate the readiness and KAP of expectant mothers regarding infant oral health care and to see the impact of Motivational interviewing on their KAP to incorporate healthy behaviours for their infants.

Aim and Objectives

Aim:

To assess the impact of motivational interviewing on knowledge, attitude and practices of expectant mothers about infant oral health care in a tertiary care centre.

Objectives:

1. To assess the readiness to change of participants according to sociodemographic data of the participants
2. To evaluate the knowledge, attitude and practices at baseline according to sociodemographic data of the participants.
3. To evaluate the impact of motivational interviewing on participants
4. To evaluate the impact of motivational interviewing at 3 months interval by telephonic followup.

Review of Literature

Burke B (2003)[17] in his meta-analysis included 30 clinical trials of Adaptations of Motivational Interviewing (AMI) , representing a wide variety of studies. AMIs were equivalent to other active treatments and yielded moderate effects compared with no treatment and/or placebo for problems involving alcohol, drugs, and diet and exercise. Results did not support the efficacy of AMIs for smoking or HIV-risk behaviors. AMIs showed clinical impact, with 51% improvement rates, a 56% reduction in client drinking, and moderate effect sizes on social impact measures (d 0.47). Potential moderators (comparative dose, AMI format, and problem area) were identified using both homogeneity analyses and exploratory multiple regression.

Results are (have been) compared with other review results and suggestions for future research are (have been) offered.

Weinstein P, Harrison R, Benton T (2004)[18] compared the effect of a motivational interviewing counseling treatment with that of traditional health education on parents of young children at high risk of developing dental caries. Parents of 240 infants aged 6 to 18 months were randomly assigned them to either a motivational interviewing, or MI, group or a traditional health education (control) group. Parents in the control group received a pamphlet and watched a video. Parents in the MI group also received the pamphlet and watched the video; in addition,

They received a personalized MI counseling session and six follow-up telephone calls. After one year, children in the MI group had 71 new carious lesions (standard deviation, or SD, = 2.8), while those in the control group had 1.91 (SD = 4.8) new carious lesions. The study concluded that Motivational interviewing, a brief form of counseling, presents promise in working with the parents of young children to prevent caries in those children, especially children at high risk of developing the disease.

Kaste LM et al (2007)[8] studied the impact of a minimal intervention of providing one a lecture on children's oral health on short-term oral health knowledge gain of pregnant women from vulnerable African American (AA) and Hispanic of Mexican origin (HM) populations utilizing the same urban community health center prenatal education program. The participants received:

(i) an information sheet explaining the research project; (a) a pre-survey (taken before the lecture); and (3) a sealed envelope containing a post-survey (taken after the lecture).The prenatal dental education lecture ran 45 minutes and covered the following oral health topics: (l) baby bottle use; (2) breast-feeding practices; (3) oral hygiene instructions; (4) age of the first dental visit; (5) use of bottled water; (6) nutrition; (7) fluoride/prevention; and (8) non-nutritive sucking habits. The pre- and post surveys were identified by the same unique number and by, respectively, "A" or "B."The information presented was based on American Academy of Pediatric Dentistry (AAPD) guidelines, and consistency was sought across the seven lectures by following these guidelines and a written script. The results showed that pre-lecture scores on infant oral health differed for the HM origin and AA women participating in prenatal education classes, even though they were from the same community health center. Providing the same oral health content in a single lecture yielded improved dental knowledge scores and decreased disparities in knowledge between Hispanic of Mexican origin and African American expectant women

Harrison R, Benton T, Everson-Stewart S, Weinstein P(2007)[18] tested motivational interviewing (MI) to prevent early childhood caries; and used Poisson regression for data analysis. Methods: In this study A total of 240 South Asian children 6 to 18 months old were enrolled and randomly assigned to either the MI or control condition. Children had a dental exam, and their mothers completed pretested instruments at baseline and 1 and 2 years post intervention. Other covariates that might explain outcomes over and above treatment differences were modeled using Poisson regression. Hazard ratios were produced. Analyses included all participants whenever possible. Poisson regression supported a protective effect of MI (hazard

ratio [HR]=0.54 (95%CI=0.35-0.84)—that is, the MI group had about a 46% lower rate of dmfs at 2 years than did control children. Estimates of similar treatment effect were obtained from models that included, as alternative outcomes, ds, dms, and dmfs, including "white spot lesions." Exploratory analysis revealed that rates of dmfs were higher in children whose mothers had: (1) prechewed their food; (2) been raised in a rural environment; and (3) a higher family income (P<.05). The study concluded that a motivational interviewing-style intervention shows promising result to promote preventive behaviors in mothers of young children at high risk for caries.

Saied-Moallemi Z (2008)[19] evaluated the influence of mothers' oral health related knowledge and attitudes on the tooth-brushing behavior and dental health of their children and compare the effect of these maternal aspects on child's oral health Mothers' knowledge of oral health. Eight statements on different aspects of oral health (microbial plaque, causes and prevention of oral diseases), Mothers' attitudes towards oral health. Six statements about the importance of oral health and the seriousness of oral diseases, with the same scale as for the knowledge statements Mothers' level of education. Mothers were asked for information on their level of education, Children's tooth-brushing behaviour and dental status. The children were first asked a question "How often do you usually brush your teeth?" with the following alternatives: "irregularly or never", "once a week", "a few times a week", "once daily", and "twice daily or more". The question was asked twice and a comparison was made between the answers. A clinical dental examination was then performed by one of the authors (Z.S-M.) based on WHO criteria for recording children's dental health [WHO, 1997]. DT and dt values facilitated assessment of the children's dental status. Children with no decay experience in primary and/or

permanent dentition (DT and/or dt = 0) were defined as having sound dentition [WHO, 1997]. Intra-examiner reliability for diagnostic criteria resulted in a kappa value of 0.9 (Saied-Moallemi et al., 2006).The study conclude that Twice-daily tooth-brushing behaviour and sound dentition in 9-year-olds were both associated with the positive oral health-related attitudes of their mothers. When developing oral health promotion programs for children and adolescents, the considerable potential in mothers should be taken into account and advocated by oral health professionals

Warren JJ et. al. (2008)[20] in a cross-sectional analysis assessed the factors associated with caries in children aged 6 to 24 months. Two hundred twelve mothers with children 6 to 24 months of age were recruited from Special Supplemental Nutrition Program for Women, Infants, and Children clinic sites in southeastern Iowa for participation in a longitudinal study of dental caries. Baseline assessments included detailed questions regarding the children's beverage consumption, oral hygiene, and family socioeconomic status. Dental caries examinations using the d1d2-3f criteria and semi-quantitative assessments of salivary mutans streptococci (MS) levels of mother and child were also conducted. Counts/ Score of the number of teeth with visible plaque were recorded for maxillary and mandibular molars and incisors. Results suggested that not only microbial measures, including MS and plaque levels, are closely associated with caries in very young children, but that other age-related factors may also be associated with caries.

Plutzer K, Spencer AJ(2008)[21] studied the efficacy of an oral health promotion intervention in the prevention of early childhood caries. The programme was developed around the provision of anticipatory guidance to nulliparous women

(women expecting their first child) in Adelaide. Mothers in the test group received oral health promotion information during pregnancy, and later when the child reached 6 and 12 months of age. After the second round of information the test group mothers were randomized again. The information was reinforced in one of the test subgroups through a telephone consultation. There was no contact with mothers in the control group after enrolment. At the age of 20 ± 2.5 months all test and control group children were examined by a dentist. Of 649 women enrolled in the programme (test group 327, control group 322), 441 had their child examined at follow-up.the study concluded that the oral health promotion programme based on repeated rounds of anticipatory guidance initiated during the mother's pregnancy was successful in reducing the incidence of S-ECC in these very young children.

Gussy MG et al (2008)[22] This study examined the oral health-related knowledge, attitudes and reported behaviors of parents of children aged 12–24 months living in rural areas of Victoria, Australia. A community intervention trial was planned to test the effectiveness of a programme providing training in oral health promotion to health care professionals (HCPs) with high levels of contact with families of infants and toddlers. The most important component of this multi-faceted intervention was the distribution of free toothpaste. The toothpaste was part of a total package which included an age-appropriate toothbrush, educational literature and individualized advice provided by the MCHN to parents at this visit. Other Health Care Providers (medical doctors, dentists and paediatricians) were also included in the training to ensure that oral health information and advice was consistent for parents at all health care encounters. Knowledge regarding risk and protective factors amongst parents was variable and sometimes at odds with contemporary evidence. Knowledge

of the role of early infection with S. mutans was very low, with high levels of behaviors that may promote early transmission reported. Tooth cleaning was reported by most parents at least sometimes, however a large proportion lacked confidence and this was significantly related to the frequency of the cleaning. Parents were confused about the fluoride status of their water supplies. Most parents believed fluoride toothpaste reduced the risk of ECC but did not know whether it should be used with toddlers.

Shivaprakash PK, Elango I, Baweja DK, Noorani HH(2009)[6] studied the knowledge and awareness regarding infant oral health care amongst parents and dental and medical students. A cross-sectional survey was undertaken among 200 parents and 200 dental and medical students. A multiple choice questionnaire was developed, and the questionnaire administered to the students had 17 observations and that issued to the parents consisted of 13 items which focused on various preventive strategies of preventive dental health. The study concluded that both groups of respondents (students) were equally unaware regarding – the right time to introduce the child to drink from cup and association of poor maternal oral health to preterm/low birth weight baby. The study also compared the disparity in knowledge and awareness among urban and rural parents and there was a variation seen in the responses amongst both the groupsn (parents).

Frudenthal JJ, Bowen DM(2010)[23] examined if an individualized motivational interviewing (MI) approach to oral health education promoted positive changes in early childhood caries (ECC) risk–related behaviors of mothers enrolled in a Women, Infants and Children (WIC) Program. Seventy–two mothers were recruited

to complete pretest and Post test questionnaires 4 weeks apart. Mothers in the treatment group experienced a counseling type session (MI) and follow–up telephone calls to promote positive oral health behaviors. Results of this study found no clinically significant change in valuing dental health, permissiveness, convenience and change difficulty or openness to health information as a result of an MI intervention. Two practices, sharing utensils during feeding and the number of times a week mothers brushed or cleaned their child's teeth, were positively impacted in the group of mothers exposed to MI intervention. A long–term study with parallel and diverse populations would add to the literature of using MI.

Suresh BS, Ravishankar TL, Chaitra TR, Mohapatra AK, Gupta V(2010)[24] assess the mother's knowledge about the oral health of their pre-school children in Moradabad, India. Mothers of children aged 1–4 years, attending the hospital for vaccination or regular checkups in the pediatric division of government hospitals, were invited to participate in the study. A 20-item questionnaire covering socio-demographic characteristics, dietary practices, oral hygiene practices and importance of deciduous teeth, was distributed to their mothers, during their visit to the hospital. it was found that mothers were found to have a good knowledge about the importance of oral hygiene practices and importance of deciduous teeth, respectively.

Mothers with higher educational qualification and information gained through dentist had a better knowledge about child's oral health. Oral hygiene habits and dietary habits are established during pre-school days and the parents, especially mothers, function as role models for their children.

Cardenas LM and Ross DD(2010)[25] evaluated the gain in knowledge of oral health after education to pregnant women on dental anticipatory guidance and determined how much of this information pregnant women retain over time. 40 subjects were included in the study ; at first, the knowledge of oral health was assessed using a questionnaire which was divided into three sessions (maternal health during pregnancy, infant and child oral health), respectively. Special

Emphasis was placed on the infant child's oral health. Then an educational lecture was delivered for 10 min and again the knowledge was assessed by post test. After completing the post-test, both tests were graded and the results were discussed with the women. Explanations were also given to clarify why questions were answered incorrectly. A follow up was done after 4 weeks. The results demonstrates an average of 34.67% improvement from pre-test to post-test with a slight decrease in average of 3.04% from post-test to follow-up test. This study showed that participants did not receive any oral health education from their physicians (obstetrician/ gynecologist) during their pregnancy and hence, educating pregnant women on oral health can be beneficial and that pregnant women are capable of retaining most of the information for at least one month. Information on oral health should be included in education provided to pregnant women, especially for those of underserved backgrounds (who are at increased risk) through federal and/ or state-based programs

Baginska J , Rodakowska E (2011)[26] assessed the knowledge and practice of mothers of young Children from the area of Bialystok, Poland, on the prevention of tooth caries. 140 mothers of 3-4 year old children took part in an anonymous voluntary survey. The questionnaire used in the survey was related to the knowledge

of principles of dental caries prevention, the sources from which mothers obtain their knowledge and the methods of implementing oral health behavior.

In the survey, 95.7% of mothers knew about the importance of regular removal of dental plaque by brushing teeth, 85.7% knew of the role of fluoride-containing toothpaste and 82.8% indicated avoiding the consumption of sweets. They were also aware that oral health required regular dental visits (89.2%). Most of them (87%) knew that deciduous teeth should be treated as permanent ones, but only 65.7% were convinced that a direct relationship of the condition of deciduous and permanent dentition exists. The survey revealed a discrepancy between the knowledge of principles of dental caries prevention and their implementation in everyday life among mothers of young children from Bialystok, Poland. There was a large percentage of 3-4 year old children who brushed their teeth 1-3 times a week (15%) or less frequently (3.6%). In the sample, 10% of 3-4 year old children visited a dentist for the last time a year ago, and another 42.8% had never been on such a visit. Mothers in the survey had basic knowledge of caries prevention. However, it was not implemented in their day to day life.

Huston PJ, Foster KA, Gantan J, Wood AJ, Berg JH (2011)[27] have described the process of motivational interviewing in a very systematic way as given below

1. *Core Communication Skills* Set

• Ask the person where they want to progress to and get to know him or her a bit

• Inform the person about options and see what makes sense to them.

• Listen to and respect what the person wants to do and offer help accordingly.

2. *Principles* of *Motivational lnterviewing3*

• Express empathy. Change occurs only if the person feels accepted and valued.

• Demonstrate discrepancy. Explore the gaps between the pros and cons.

• Roll with resistance. Avoid arguing and accept resistance as normal.

• Empower and support self-efficacy. Transfer the responsibility of arguing for change to the caregiver.

3. *Brief Negotiation* Steps4

• Set the stage. Askfor permission before beginning to explore thoughts/feelings.

• Provide factual information and elicit feedback

• Assess the family's readiness to change.

• Explore ambivalence and elicit change talk Base your approach on parent's/ caregiver's readiness to change.

• Close the conversation. Summarize, encourage, acknowledge willingness to discuss change and determine next step.

4: "BEST Off MI Question Examples

B Bacteria

Did you know the acid that burns the cavities or holes in teeth comes from germs passed in adult saliva to their children?

(Pointing to plaque on child's teeth)

Did you know that this is where the bacteria do their mischief?

E Enamel

(While demonstrating) See how easy it is to lift the upper lip and inspect Elise's teeth regularly?

Did you know brushing with an amount of fluoride toothpaste only the size of a grain of rice protects the teeth from germ acid burns?

SSaliva

How do you keep Elise's mouth clear of all substances so that saliva's natural healing powers can work?

(Child on medications. Seven of the ten most commonly prescribed medications cause dry mouth.)

Have you noticed Elise wanting to drink alot of water?

T Time

Have you heard visiting the dentist before age one can save your child from getting cavities and save you money?

Did you know that the more times your child snacks and the longer time food or drinks remain in the mouth the risk of decay keeps going up and up? o-Would you be surprised to learn that when teething starts, almost all babies can sleep all night without eating or drinking?

Of course sugar is the worst, but did you know that milk, crackers, cooked starches (potatoes, white rice and white bread) are also changed into acid by bacteria and can damage your child's teeth

Graham-Montaque R(2012)[28] evaluated maternal influences on early childhood dental caries and to describe the dental disease status of a population of mother infant dyads enrolled in the Children Health Involving Parents of Greater Richmond (CHIP). The RAPIDD scale is a valuable instrument in measuring mother's knowledge of infant oral health information. Preliminary findings indicated that a DMFT score of 80% in mothers translated to a 50% chance of dental caries in

infants. However, if parents had a DMFT of 0%, then the infants had a 14% chance of dental caries. The Oral Health Literacy Tool was developed with the intention of measuring functional health literacy of mothers. Preliminary findings indicate that the majority of the participants were contemplative parents. This is indicative of a willingness to consider changing their behavior, but a hesitance without the accurate tools and confidence to implement the change.

Hom JM (2012)[29] conducted an observational cohort study to determine the levels of oral health literacy (OHL) and oral health knowledge in low income patients who were pregnant for the first time . To assess oral health–related knowledge, a six-item knowledge survey was carried out. The women were asked to answer "agree," "disagree" or "don't know" to knowledge-related statements such as "Fluoride helps prevent tooth decay" and "Tooth decay in baby teeth can cause infections that can spread to the face and other parts of the body."The response "don't know" was combined with incorrect responses .the study concluded that among women who were pregnant for the first time, OHL levels were associated significantly with oral health knowledge. Because OHL levels were low in this at-risk population, dental professionals and public health workers should be aware that messages can be tailored to the patients' OHL levels to improve oral health knowledge effectively in this vulnerable group..

Nagraaj A , Pareekh S(2012)[7]. Assessed the knowledge, attitude and practices of pregnant women and mothers about feeding habits and infant oral health. A total of 230 study subjects were divided into two groups: Group A included pregnant women and group B were mothers of child up to 1 year of age. Each group

comprised of 170 subjects. A self-administered questionnaire comprising of total 23 questions on infant feeding practices, nocturnal bottle feeding, correct age of eruption of first teeth and first dental visit. Two separate questionnaires were framed for both the groups.the study concluded that there was a lack of knowledge among both the groups about infant feeding and weaning. Nocturnal bottle feeding was more prevalent.

Chhabra N, Chhabra A. (2012)[30] assessed assess the knowledge, attitude and beliefs of parents towards oral health and dental care of their children aged 1-4 years in an Indian population. Parents of 620 preschool children, who visited Krishna Dental College and Hospital, Ghaziabad, India for dental treatment were recruited into this study and completed a self-administered questionnaire. the questionnaire comprised of a small set of pre-selected topics or questions adopted from oral health literature [Peterson et al., 2000; Stenberg et al., 2000] and chosen based on the researcher's knowledge or experience of the issues under study, on the following:

1. Oral hygiene habits (frequency, duration, time and brushing aids used),
2. Role of the parents in the children's oral hygiene and dental education,
3. Diet and feeding patterns of their children,
4. Assessment of parent's knowledge of oral health and dental problems,
5. Parental attitude and opinion towards dentists and dental care,
6. Awareness of the parents regarding dental treatment and regular dental visits,
7. Cultural beliefs of the parents and their families and social influences that affected the parent's decision regarding dental treatment

The study concluded that Parents' knowledge, attitudes and beliefs about the importance of dental health need to be improved. Coordinated efforts by paediatricians, paediatric dentists and other health professionals are required to impart dental health education about oral hygiene, feeding practices, importance of the primary dentition and to promote preventive dental programmes.

Harrison R.L., Veronneau J, Leroux B(2012)[31] tested maternal counseling based on Motivational Interviewing (MI) as an approach to control caries in indigenous children. 272 mothers were recruited from the 5 test and 4 control communities. Baseline characteristics were comparable but not equivalent for both groups. At trial's end, 241 children had follow-up. The primary analysis outcome was enamel caries with substance loss (d2); no statistically significant treatment effect was detected. Prevalence of treated and untreated caries at the d2 level was 76% in controls *vs*. 65% in test (p = 0.17). Exploratory analyses suggested a substantial preventive effect for untreated decay at or beyond the level of the dentin, d3 (prevalence's: 60% controls *vs*. 35% test), and a particularly large treatment effect when mothers had 4 or more MI-style sessions. The study concluded less severity and extent of caries, in experimental group, suggests that counseling with the spirit of MI should be considered in the planning of interventions to control caries in indigenous children. Control children had evidence of more dental treatment than test children.

Nagarajappa R,et.al. (2013)[32] assessed the infant oral health (IOH) related knowledge, attitudes and practices (KAP) of parents in Udaipur, India. A cross-sectional descriptive study was conducted among 470 parents visiting the Department of Pediatrics, Rabindranath Tagore Medical College and Hospital. A 32-item questionnaire covering socio-demographic characteristics and questions pertaining to

KAP regarding IOH care was used to collect the data. Majority of the parents had good knowledge regarding tooth eruption, but had a poor knowledge of cleaning (58.7%) and development of caries (48.5%). Parents in the age group of 25-30 years showed significantly higher mean knowledge (25.90 ± 3.93), attitude (15.71 ± 2.23),and practice (20.09 ± 2.50) scores. Female parents showed a significantly higher mean knowledge (21.45 ± 4.27) and attitude scores (14.97 ± 2.15) than the male parents. Parent's knowledge on IOH care was inadequate.

Jain R, Oswal KC, Chitguppi R(2014)[33] assessed the knowledge, attitude, and practices of mothers toward their children's oral health. A cross-sectional questionnaire survey was conducted among 422 mothers of preschool children who visited dental colleges in Mumbai, India. Data were collected through an interview, using a structured proforma. The study showed that mothers had poor knowledge and attitude towards a children's oral heath due to which majority were following poor oral health practices.

Dogra S, Arora R, Bhayya D, Thakur D(2014)[34] surveyed 400 lactating mothers post partum admitted in various government and private hospitals of Udaipur city after obtaining ethical clearance from the concerned authorities. Of the 400 subjects included, 200 mothers were from the rural area of the nearby villages of Udaipur city and 200 mothers were from urban area of Udaipur city. A multiple choice questionnaire consisting 18 questions was developed which was divided into two parts- first part consisted of general information and the second part consisted of the questions. The questions were mostly on knowledge regarding infant's oral health. The questionnaire was not pretested and the data was directly collected from each

group. The responses were assessed based on the recommendations of American of Paediatric Dentistry (AAPD). Based on the results of this study it was found that knowledge of mothers was inadequate on IOH care, urban mothers had a comparatively poorer knowledge than rural.

Ramos GM, de Castro LB, Neves B, Rocha CT. (2014)[14] Assessed the knowledge of pregnant women on the oral health of the baby. The study sample consisted of pregnant women who took prenatal exams in the period of data collection (n=125), randomly selected while using the service at the health unit. Data were collected using a form with open- and closed-ended question about pregnant women's identification, socioeconomic characteristics and knowledge of oral health of the baby. The results showed that the surveyed women were aware of the importance of breastfeeding and the need for early implementation of hygienic measures. However, they were unaware of some fundamental concepts for effective promotion of oral health of the baby, such as caries transmissibility, the optimal timing for the first dental visit, use of bottle and etiological factors of dental caries. Furthermore, 81.6% of the women were not instructed on oral health during prenatal care. The study concluded that, It is necessary to implement a strategy focused on oral health care for pregnant women, because during pregnancy the woman is more receptive to new information and changes habits that, in turn, will reflect in the promotion of their children's oral health**.**

Naidu R (2015)[10] compared the effect of MI, in contrast to traditional dental health education (DHE), on oral health knowledge, attitudes, beliefs and behaviors among parents and caregivers of preschool children in Trinidad. The design of this

exploratory study included a cluster randomized controlled trial and semi-structured focus groups. Six preschools (79 parents and caregivers) in Eastern Trinidad were randomly assigned to a test or control group (3 preschools in each group). Parents and caregivers in the test-group (n = 25) received a talk on dental health using an MI approach and the control-group (n = 54) received a talk using traditional DHE. Both groups received additional, written dental health information. The MI group also received two telephone call follow-ups as part of the MI protocol. Both groups were given questionnaires before the talks and four months later. Question items included oral health knowledge, beliefs, attitudes, brushing behaviour, oral health self-efficacy, oral health fatalism and a specific instrument to asses 'readiness for change', the Readiness Assessment of Parents Concerning Infant Dental Decay (RAPIDD). Participants in the test-group were also invited to take part in a focus group to share their views on the dental health talk. In this exploratory controlled study there was some evidence that using an MI approach when delivering oral health information had a positive effect on parent/ caregiver oral health knowledge, attitudes and behaviours compared to traditional DHE.

Thomas A, Jacob A, Kunhambu D, Shetty P, Shetty S(2015)[15] assessed the knowledge and attitude of expectant mothers about infant oral health and their oral hygiene practices a cross-sectional questionnaire based survey conducted among expectant mothers in Mangalore city, India. Three hundred expectant mothers fulfilling the inclusion and exclusion criteria were randomly selected based on convenience method over a period of 1 month. The data were collected using a self-administered questionnaire addressing the various aspects of expectant mothers' knowledge and attitude about infant oral health and their own oral hygiene practices.

The overall score revealed that majority of the expectant mothers had poor knowledge and attitude toward infant oral health and followed poor oral hygiene practices. Expectant mothers' educational qualification, trimester, and the number of pregnancy had a significant role in their knowledge, attitude, and oral hygiene practices.

Riedy CA et al (2015)[36] this study tested a behavioral intervention to increase dental attendance among rural Oregonian low income women and their children. It utilized a multi-site, single-blind, randomized trial design. 400 women were randomized into one of four conditions to receive prenatal or postpartum motivational interviewing/counseling (MI) or prenatal or postpartum health education (HE). Counselors also functioned as patient navigators. Primary outcomes were dental attendance during pregnancy for the mother and for the child by age 18 months. Attendance was obtained from the Oregon Division of Medical Assistance Programs and participant self-report. Statewide self-reported utilization data were obtained from the Oregon Pregnancy Risk Assessment Monitoring System (PRAMS). Maternal attendance was 92% in the prenatal MI group and 94% in the prenatal HE group (RR ¼ 0.98; 95% CI ¼ 0.93e1.04).Children's attendance was 54% in postpartum MI group and 52% in the postpartum HE group (RR ¼ 1.03; 95% CI ¼ 0.82e1.28). Compared to statewide PRAMS, attendance was higher during pregnancy for study mothers (45% statewide; 95% CI ¼ 40e50%) and for their children by 24 months (36% statewide; 95% CI ¼ 27e44%). MI did not lead to greater attendance when compared to HE alone and cost more to implement. High attendance may be attributable to the counselors' patient navigator function.

Almoudi MM et al (2016)[16] assessed the readiness and barriers faced by expectant mothers in Libya to initiate preventive oral health care for their children. A cross-sectional quantitative survey was conducted based on a structured questionnaire in a face-to-face interview. Four hundred and thirty seven expectant women who attended three main public maternal centers in three different districts in Libya were invited to participate. Expectant mothers' knowledge and attitudes toward their child's oral health care in Libya are inadequate. Additionally, only less than one-fifth (17.7%) of them were ready in terms of their knowledge, attitudes and willingness to initiate preventive oral health care for their children. There was a significant relation between the overall readiness of the mothers and their age. The three most frequent barriers which reported by the majority were their busy schedules at work/home, insufficient information and skills to start preventive oral health care. A high priority should be placed on the development and implementation of wide-scale, long-term programs of health education and promotion for Libyan young expectant mothers that would help to increase aspects of oral health knowledge and skills that they lacked.

González-Del-Castillo-McGrath M et. al. (2016)[35] studied the effectiveness of a motivational interviewing-based educational program in reducing the number and intensity of new caries and bacterial dental plaque levels at 6 months post randomization. A randomized and single blind clinical trial in 100 schoolchildren between 6-10 years of age presenting the highest risk score of caries according to the Caries Management by Risk Assessment (CAMBRA) criteria was performed. These patients were randomized to two groups: control (in which the mothers initially received an oral prevention informative session) and experimental (in which the mothers received the initial informative session, followed by individual motivational

interviewing sessions during a period of 6 months). The International Caries Detection and Assessment System (ICDAS) scores and bacterial plaque were evaluated at baseline, at 6 and 12 months. the study concluded that Motivational interviewing is an effectiveness and promising technique for establishing preventive behaviors in relation to dental health, targeted to the parents of children at the highest risk for developing caries.

Sultan S, Ain TA, Gowhar O(2016)[37] questionnaire based study was conducted in district hospitals of Srinagar, Kashmir after taking the ethical approval from the local authorities. Female middle-aged patients were enquired about the age of their children and all the women having children below 12 years of age, willing to participate and gave informed consent, were included in the study. The study was planned and carried out for a period of three months; with an average of 5 to 10 patients per day; making a convenient sample of 500 patients. A self administered questionnaire, written both in English and local language (urdu) was personally distributed to the mothers who had visited the district hospital for their own ailments. Questionnaire containing 10 questions was pretested to ensure its validity. The first part of the questionnaire included demographic information regarding mother's age and level of education. The second part had questions related to the awareness of mothers regarding deciduous dentition indicating different risks for dental disease among their children. The duly filled questionnaire was collected from the participants on the same day after 15 to 20 minutes. To check the reliability and internal consistency of the questionnaire Cronbach's alpha was used and it was found satisfactory.

Suma Sogi HP(2016)[38] evaluated the existing knowledge, attitude, and practices of "oral health care" in the prevention of early childhood caries (ECCs) among parents of children in Belagavi city. A cross-sectional study was conducted in the outpatient Department of Pedodontics and Preventive Dentistry, KLE VK Institute of Dental Sciences, Belagavi, Karnataka. Parents getting their children treated for dental caries and who were willing to participate were included in the study. Parents who could not read and write were excluded from the study. The self-administered, close ended questionnaire was written in English. It was then translated in local languages, i.e. Kannada and Marathi, and a pilot study was conducted on 10 parents to check for its feasibility and any changes if required were done. The response rate was 100% as all 218 parents completed the questionnaire. Of 218 parents, 116 were mothers and 102 were fathers. The overall mean knowledge score was 69.5%. The overall mean attitude score was 53.5%. The overall attitude toward prevention of ECC was not in accordance to knowledge. The overall mean of "good" practices and "bad" practices score was 33.5% and 18.5%, respectively.

Al-Ayed IH (2017)[39] studied assessed the level of mothers' knowledge on certain aspects of child health care and whether there was any correlation between their level of knowledge and the number of years of formal education they have had. A two-part questionnaire was distributed. The first part comprised information about mother's nationality, age, work, level of education and number of children, in addition to sources of health information and the role of school education in child health matters. The second part contained 40 statements about different aspects of child health matters. A structured interview with the mothers, who attended with their

children at the pediatric outpatient clinic of King Khalid University Hospital in Riyadh during July and August 2007, was conducted by a trained non-medical research assistant using the items and statements of the questionnaire as a base. The study revealed significant gaps in mothers' knowledge of certain child health matters. It also revealed that health education in schools was deficient and it also exposed the limited involvement of health care personnel and institutions in health care education.

Corriae P N (2017)[40] determined the oral health knowledge of pregnant women to report their future plans to provide dental care for their expected child. The eligibility criteria were English speaking pregnant women, aged 18 years or older. A participant information sheet and verbal explanation was given to prospective participants and consent was obtained prior taking part in the study. A self-report questionnaire was administered to participants. This contained questions from the UK Adult Dental Health Survey (ADHS) 2009, as well as specific questions relating to pregnancy, such as oral health habits during pregnancy, general oral health knowledge and oral health plans for their unborn baby. The questionnaire contained different topics entitled: 'About me', 'Tooth decay and gum disease prevention', 'Delivery of oral health Advice during these pregnancy ', 'about my children's teeth', as well as optional questions on 'Age' and 'Ethnic background'. The questionnaire had been discussed and improved by specialists within Dental Public Health, Midwifery (Research and Antenatal Education expertise) and Paediatric Dentistry. The pregnant women were asked to complete the questionnaire, in the waiting area, before their scan. The result revealed a lack of oral health knowledge among pregnant women, even though they support receiving oral health information at this time. Although service provision, professional attitude and government policies promote the

acquisition of behaviors, understanding the habits and acquired knowledge of a population constitute a key plank in delivering oral health. Additionally involving participants and members of the public into commenting and developing research materials is essential to refine a project aims and outcomes and to offer the best health care (INVOLVE). The findings on this study can support the design of an integrated antenatal-oral care programme targeting the needs of expectant mothers and their offspring to address the benefit of fluoride varnish, correct fluoride dose and timing of toothbrushing, cariogenicity of dried fruit, fruit juices, as well as avoiding prolonged milk feeding during the night after weaning.

Mishra P, Marwah N, Sharma A, Thejavinuo, Padiyar B(2017)[41] evaluated the knowledge and belief of expectant mothers in third trimester about importance of primary teeth and their care. 500 expectant mothers in the 3rd trimester of their pregnancy were surveyed for their knowledge about importance of primary teeth and their care. The results indicated that there was minimal knowledge amongst the expectant mothers , 95% agreed that oral hygiene maintenance is important, 45% rural correspondents believed primary teeth were of scant importance. More than 40% disagreed that night time bottle feeding can cause caries. The study concluded that implementing educational awareness regarding primary teeth will bring about change in the mindset of expectant mothers.

Togoo RA, et al (2017)[42] assessed caregivers' knowledge, attitudes, and oral health practices for infants attending day-care centers in two major cities in southern Saudi Arabia. Participants who met the inclusion criteria comprised 302 caregivers from 48 day-care centers. Data was collected using a questionnaire focused on the

knowledge, attitudes, and oral health practices of caregivers for infants attending day-care centers. The study showed that factors causing dental caries in infants were known to the majority of the caregivers. A national oral health campaign focused on oral healthcare for infants should be a priority. Parents and secondary caregivers should be involved in dental health education programs to improve their knowledge about infant oral health and practices that would help in the prevention of early childhood caries.

Shinde PP et al (2018)[43] studied evaluated the knowledge, attitude, and practice about infant oral care among professional working mothers in Pune city, India. A 28-item semi-closed, closed-ended questionnaire was administered to 111 professional working mothers in Pune city, India. The data for demographic details, knowledge, attitude, and practice regarding infant oral care were collected with the help of this predesigned self-administered questionnaire from working professional mothers attending outpatient department of Pediatric Hospitals in Pune city.the study concluded that all the mothers had limited knowledge about infant oral care. Almost all mothers had positive attitude toward their infant's oral care. Even though the mothers had a positive attitude toward oral care of the infants, due to lack of adequate knowledge, they were not able to provide appropriate oral hygiene care for their infants.

Batra M, Shah AF, Virtanen JI.(2018)[44] studied the integration of oral health in primary Health care through motivational interviewing (MI) provided by ASHAs for mothers of young children. The study was conducted in 3 randomly selected PHCs. one each was assigned to MI group, traditional health education

group, and control group. From 60 mothers with 8–12 months child, ASHAs of all three groups gathered mother's knowledge regarding child's oral health using close‑ended questionnaire and diagnosed clinical risk markers of ECC in children and ASHAs of Group A and B imparted the oral health education as per their training. The study concluded that The health education through MI is feasible and can be cost-effective by utilization of ASHAs at PHCs to provide the oral health education to mothers which will in turn improve the oral health status of children.

Tyagi R.(2018)[45] found the prevalence of nursing caries in Davangere preschool children and its relationship with feeding practices and socioeconomic status of the family. A total of 813 children aged 2–6 years were screened for the present study from randomly selected three kindergarten schools each from Government, Government aided, and private managements. Clinical examination was done inside the respective schools. At the time of examination, a proforma was filled for each child comprising of DFS index. The questionnaire by Winter *et al.* was modified and used in this study. The completed proforma were statistically analyzed to find if any correlation existed between the nursing caries to the feeding practices and socioeconomic status of the family. There was a strong and significant relationship between the severity of nursing caries and the degree of feeding abuse. Children from low socioeconomic status have increased early childhood caries. The prevalence of nursing caries was 19.2% in Davangere preschool population. Nursing caries were more in children who were taking a feeding bottle to bed at night and were increasingly seen in large families and lower socioeconomic groups.

Committee on Health Care for Underserved Women; The American College Of ObGy[46](2009) defined Motivational interviewing as , "a directive, client-centered counseling style for eliciting behavior change by helping clients explore and resolve ambivalence".they described the Principles and Practice of Motivational Interviewing,its effectiveness, application, training approaches and coding in obstetrics and gynecology

Djordjevic A(2018)[47] studied the influence of parents´ knowledge about the effects of oral hygiene, proper nutrition and fluoride prophylaxis on oral heath in early childhood. Parents were asked to fill a questionnaire which consisted of three sections, oral hygiene, fluoride prophylaxis and nutrition. The study included 136 parents of children, aged between 3-6 years. The survey was conducted in pedagogical-education institution – PE "Our happiness" - Leposavic, Kosovo and Metohia, Serbia. More than 58% parents from urban areas and 63% parents from rural areas were informed that the teeth should be brushed at least twice a day (p=0.007). Only 31.11% of parents from urban and 15.22% of parents from rural areas were informed that a child should visit dentists for the first time, at the one year of age (p=0.083). The analysis of the questionnaire section regarding the nutrition and oral health, showed that parents from rural areas were better informed than parents from urban areas. Awareness about fluoride and their role in preventive dentistry was poor, as only 3% of children from urban and 1% of children from rural areas were using tablets based on fluoride while only 1% of children from urban and none from rural areas were using fluoride mouth rinses. This study showed that parents from urban and rural areas have the knowledge about the impact of oral hygiene, proper nutrition on the oral health but unfortunately they do not apply their knowledge in practice. Parents have the information about fluoride prophylaxis in oral health, but it can be concluded that in practice very rarely or never use tablets or solutions based on fluoride.

Colvara BC, Faustino-Silva D D, Meyer E, Hugo F N, Hilgert JB , Celeste RK,(2018)[48] assessed the effectiveness of motivational interviewing in preventing early childhood caries compared with conventional oral health education. Twelve health care units in southern Brazil were randomly allocated in 2 groups of 6 and professionals in 1 group were trained in motivational interviewing. The mothers/children and external examiners were blinded to the intervention. The data were collected by calibrated examiners using questionnaires and a clinical examination based on modified International Caries Detection and Assessment System criteria. Of the 674 children born in the catchment area in the year 2013, 469 received the intervention (224 in the conventional oral health education group, 245 in the motivational interviewing group), and 320 were examined by the end of the study (145 in the conventional oral health education group, 175 in the motivational interviewing group), with mean age of 30 months. The final follow-up was 68%, after 3 years. Mean of decayed, missing, and filled surfaces at the end of the study period for the whole sample was 1.34 (95% CI 0.97-1.71). The caries rate per 100 surface-year in the conventional oral health education group was 1.74 (95% CI 1.14-2.34) and in the motivational interviewing group, it was 0.92 (95% CI 0.63-1.20). To correct for clustering effect and unbalanced factors, multilevel Poisson regression was fitted and the effect of motivational interviewing on the incidence rate ratio was 0.40 (95% CI 0.21-0.79).The study concluded that Children whose mothers were submitted to a dental visit based on motivational interviewing showed lower caries incidence than those that attended a conventional oral health education. There was a 60% decline in the risk of caries among children from motivational interviewing group in the period of follow-up.

Material and Method

This was a questionnaire based study, to evaluate the impact of Motivational Interviewing [MI] on knowledge, attitude and practice of expectant mothers regarding infant oral health care. Institutional Ethical Committee clearance was obtained prior to the commencement of the study. The study was conducted in the department of Obstetrics and Gynecology of a tertiary care centre in a municipal city of Maharashtra; prior permission for carrying out this study was obtained from the Head, Department of Obstetrics and Gynecology of the tertiary care center. The purpose of this study was explained in vernacular languages (Hindi, Marathi) to the expectant mothers and only those mothers were included who agreed to participate in the study.

Sample size:

Referring to the study by Thomas A. et al. (2015)[15], the authors have evaluated the knowledge attitude and practices of expected mothers about infant oral health through a questionnaire based survey in Mangalore city (Karnataka). The proportion of mothers answering the questions correctly was obtained for each question. The aggregated correctness of answers across questions was nearly 42%. Mangalore city has a high literacy level of 91.41%; as that of the municipal city of Maharashtra where the study was conducted. The literacy levels of both the regions according to the 2011 census were compared. In view of this and in the absence of such studies in the region, we assumed correctness of responses to be 25%.

Assuming 5% error in the estimation, a sample size of **288** expectant mothers would have provided the desired result with 95% confidence.

Since, the survey included follow ups, to assess the change in the knowledge and awareness level, considering the likelihood of 10% drop outs, the sample size was targeted to **317**.

The formula used for estimation of the sample size was:

$$n = \frac{Z^2 pq}{\varepsilon^2}$$

where Z is the standard normal value at 5% level, p is the proportion of correctness, q=1-p and ε is the tolerable error (5%).

Methodology

Expectant mothers who were in 2nd and 3rd trimester enrolled in a span of four months in the antenatal care offered by the Department of Obstetrics and Gynecology at a tertiary care centre in the city, were the population sampled for the present study. The study participants were randomly selected based on convenience method from those reporting to the OPD of Obstetrics and Gynaecology.

Inclusion criteria:

- Expectant mothers who were in 2nd and 3rd trimester of pregnancy coming to the Gynecology OPD of a tertiary care center in the city.

Exclusion criteria:

- Expectant mothers who were not willing to take part in the study
- Expectant mothers who cannot communicate in either of the vernacular languages and those who require an interpreter were not included in the study.
- Expectant mothers with physical and mental disability.

Data collection questionnaire:

A pre-survey questionnaire was prepared for data collection.(Annexure 1) The questionnaire had three parts. The first part contained questions with respect to the demographic background of the expectant mothers which included the age, educational qualification, trimester, the number of pregnancies, miscarriage, birth of the previous baby was full term or not.

The second part included the Readiness Assessment of Parents Regarding Infant Dental Decay (RAPIDD) scale. It is a measure of parental readiness to change

towards child's dental behavior. This scale is based on Four constructs (Openness to Health Information, Valuing Dental Health, Convenience and Change Difficulty and Child Permissiveness,); it was modified according to the study and only two constructs were included.[10].

The third part included a total of 34 questions of which 20 questions were based on knowledge about oral hygiene practices, the importance of oral health, causes of tooth decay, correct age of weaning, the importance of deciduous dentition, first dental visit, breastfeeding/ bottle feeding, duration and frequency of feeding, infant formula, sugar content in infant's diet were included in the questionnaire, 6 questions were based on attitude toward infant oral health, and 7 questions were based on the oral hygiene practices of the expectant mothers.

The questionnaire was validated by two subject experts to ensure the validity and reliability of the questionnaire. The questionnaire was prepared originally in English and then translated to vernacular languages. These versions were then back-translated into English by another two people fluent in both vernacular languages and English. The back-translated version was compared with the English version to verify that the questions were properly translated. A pilot study was conducted with 10 % of the questionnaires for clarity and consistency of the questions in the selected health center. Then necessary correction was made based on the feedback of the data collectors.

The post-survey questionnaire contained the same questions as the pre-survey. Expectant mothers filled out a questionnaire prior and after receiving a motivational intervention

Motivational Interviewing [MI]

The principal investigator was trained by a psychology counselor and an expert in the field of education technology for MI, in four sittings of 1 hour each with practice under their supervision.

The principal investigator conducted only one session of MI for expectant mothers,who participated in the study, to maintain the uniformity of the sessions for each participant.

The training included following pattern [27]

1. Core Communication Skills Set

- Ask the person where they want to progress to and get to know him or her a bit
- Inform the person about options and see what makes sense to them.
- Listen to and respect what the person wants to do and offer help accordingly.

2. Principles of Motivational Interviewing

- Express empathy. Change occurs only if the person feels accepted and valued.
- Demonstrate discrepancy. Explore the gaps between the pros and cons.
- Roll with resistance. Avoid arguing and accept resistance as normal.

- Empower and support self-efficacy. Transfer the responsibility of arguing for a change to the caregiver.

3. Brief Negotiation Steps

- Set the stage. Ask for permission before beginning to explore thoughts/feelings.
- Provide factual information and elicit feedback
- Assess the family's readiness to change.
- Explore ambivalence and elicit change talk Base your approach on parent's/ caregiver's readiness to change.
- Close the conversation. Summarize, encourage, acknowledge a willingness to discuss change and determine the next step.

4: BEST D MI Question

Examples

B -Bacteria

Did you know the acid that burns the cavities or holes in teeth comes from germs passed in adult saliva to their children?

(Pointing to plaque on child's teeth in the powerpoint presentation)

Did you know that this is where the bacteria do their mischief?

E -Enamel

(While demonstrating) See how easy it is to lift the upper lip and inspect child’s teeth regularly?

Did you know to brush with an amount of fluoride toothpaste onlythe size of a grain of rice protects the teeth from germ acid burns?

S-Saliva

How do you keep Child's mouth clear of all substances so that saliva's natural healing powers can work?

(Child on medications. Seven of the ten most commonly prescribed medications cause dry mouth.)

Have you noticed Child wanting to drink a lot of water?

T-Time

Have you heard visiting the dentist before age one can save your child from getting cavities and save you money?

Did you know that the more times your child snacks and the longer time food or drinks remain in the mouth the risk of decay keeps going up and up?

D- Diet

Would you be surprised to learn that when teething starts, almost all babies can sleep all night without eating or drinking?

Of course, sugar is the worst, but did you know that milk, crackers, cooked starches (potatoes, white rice, and white bread) are also changed into acid by bacteria and can damage your child's teeth?

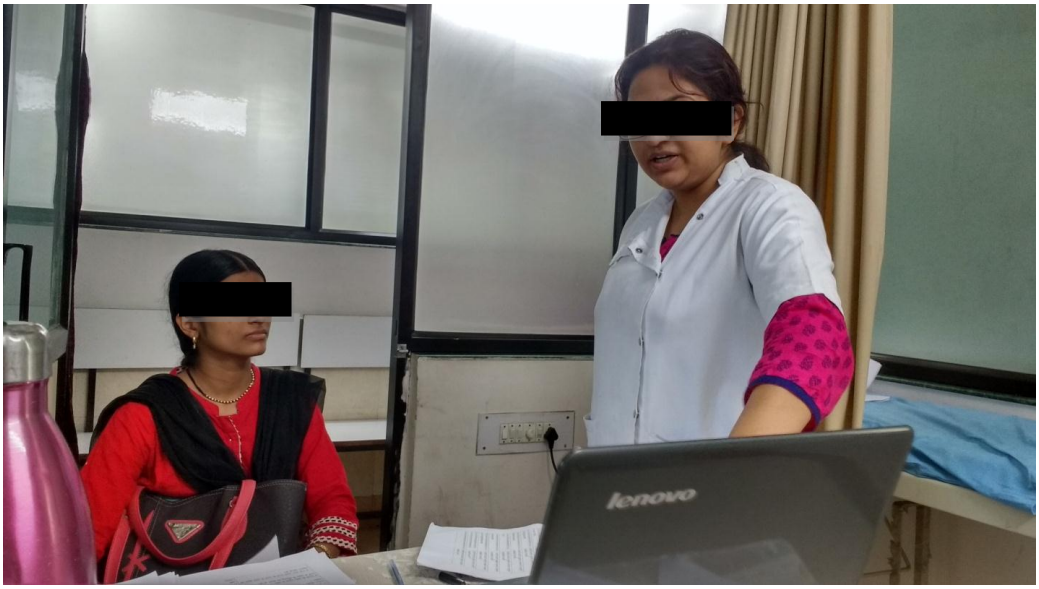
There was a follow-up of participants via telephone contact at an interval of 3 months. The telephone follow-up was undertaken by the principle investigator herself and the follow up data was recorded in the proforma.

The principle investigator monitored the overall data collection processes during the data collection period.

The data of each expectant mother recorded on the proforma was transferred daily into the Microsoft Excel worksheet. This data entry was cross-checked by the co-investigator within a couple of days, to verify the correctness of the entries; thus all efforts were made to minimize any error in the transfer of data from proforma to excel worksheet. Once the total data entry was completed an independent statistician cross-checked approximately 50% of data entry randomly with the original recorded proforma. No errors were found confirming the accuracy of data transfer from proforma to excel worksheet.

Scoring system:

Scores were based on the number of correct/ favorable answers given by mothers for the respective questions. Maximum score in each section was considered as 100%, the number of correct/favorable answers accounting for >80% were categorized as good, 51-79% as fair and <50% as poor.[33]



Motivational interviewing session going on of a participant

Result

Total sample size was 317 out which 5.3% was dropout, so the total results were carried out with a sample size of 300 excluding the dropouts.

The study involved expectant mothers to whom the questionnaire was administered. The information about age of mothers, no of pregnancy, level of education, occupation, income, history of miscarriage was obtained on the subjects and expressed in terms of numbers and percentage. The mean RAPIDD score across age categories, no. of pregnancy and income levels were compared using one-way ANOVA. The questions related to knowledge, attitude and practice were assessed for statistical significance of difference across times using Friedman ANOVA test. The comparison of KAP scores between age, no of pregnancy, education levels,

occupation levels and income levels was performed using t-test for independent samples. The distribution of subjects according to Good, Fair and Poor KAP were obtained. For more than two categories comparison, Friedman ANOVA was used, while for two categories comparison of score, Wilcoxon rank sum test was used.

All the analyses were performed using SPSS ver 20.0 (IBM Corp) software and statistical significance was tested at 5% level.

One-way Analysis of variance

Analysis of variance (ANOVA) is used to test the significance of difference in the mean of three or more groups. The basic assumption is that the variable of interest is normally distributed in the population under study.

Method

Here the interest is to test the null hypothesis that the population means are same, i.e.

$$H_0 : \mu_1 = \mu_2 = ...\mu_m$$

against the alternative H_1 that they are not same.

Some of the statistics computed to test the hypothesis are as below:

i) Grand mean: It is the mean of set of all observations in the studied groups and is given by:

$$\bar{x}_{GM} = \frac{1}{N}\sum_{i=1}^{N} x_i$$

ii) Total sum of squares: It is the sum of squares of each observation from the grand mean and is given by:

$$TSS = \sum_{i=1}^{N} (x_i - \overline{x}_{GM})^2$$

Total sums of squares is the sum of two components i.e., variation between groups and within groups.

iii) Between group sum of squares

$$SSB = \sum_{j=1}^{m} n_j (\overline{x}_j - \overline{x}_{GM})^2$$

iv) Within group sum of squares

$$SSW = \sum_{j=1}^{m} \sum_{i=1}^{n} (x_{ij} - \overline{x}_j)^2$$

The mean sum of squares is obtained by dividing the above sum of squares with the respective degrees of freedom, i.e. N-1, p-1 and $p(n$-1).

v) F-statistic: It is the ratio of between and within mean sum of squares

$$F = \frac{MS_{Between}}{MS_{Within}}$$

If the p-value based on F-statistic is greater than 0.05, H_0 is accepted, otherwise H_1 is accepted.

Friedman's test

The test is a non-parametric equivalent of parametric repeated measures ANOVA and typically used to detect the differences in observations across multiple test attempts. The procedure mainly involves ranking each row and then considering the values of ranks by columns.

- Given data $\{x_{ij}\}_{nxk}$ as a matrix of n rows (repeated measurements) and k columns (treatments), calculate the ranks within each row. If there are tied ranks, then assign an average rank that would have been assigned without ties. Replace the data with the new matrix of ranks $\{r_{ij}\}_{nxk}$ where r_{ij} is the rank of entry x_{ij} within i^{th} row.
- Find values:

$$\bar{r}_{.j} = \frac{1}{n}\sum_{i=1}^{n} r_{ij}$$

$$\bar{r} = \frac{1}{nk}\sum_{i=1}^{n}\sum_{j=1}^{k} r_{ij}$$

$$SS_t = n\sum_{j=1}^{k}(\bar{r}_{.j} - \bar{r})^2$$

$$SS_e = \frac{1}{n(k-1)}\sum_{i=1}^{n}\sum_{j=1}^{k}(r_{ij} - \bar{r})^2$$

- The test statistic Q is given by

$$Q = \frac{SS_t}{SS_e}$$

- When n or k is large (n>15; k>4), the probability distribution of Q can be approximated by chi-squared distribution. In this case, p-value is given by $P\left(\chi^2_{k-1} \geq Q\right)$, else p-values can be obtained from Q tables.

Student's t-test for independent samples

- The test is used for comparing the statistical significance of difference in the means of two samples. It compares the sample difference between two means in relation to the variation in the data (expressed as the standard deviation of the difference between the means).
- It is given by the formula:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_{(\bar{x}_1 - \bar{x}_2)}}$$

- where $\bar{x}_1$ and $\bar{x}_2$ are the means of sample observations of two different groups, μ_1 and μ_2 are the means of the respective populations from which the samples are derived, and $s_{(\bar{x}_1 - \bar{x}_2)}$ is the pooled sample standard deviation, which is given by:

$$s(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{s^2_{pooled}}{n_1} + \frac{s^2_{pooled}}{n_2}}$$

- where

$$s^2_{pooled} = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

- here s_1^2 and s_2^2 are the variance of two samples and n_1 and n_2 are the sample sizes in two groups.
- If the test statistic results in a *P*-value > 0.05 (level of significance), then the null hypothesis H_0: *There is non significantdifference in the means of two groups* is accepted and the alternative hypothesis H_1: *There is significant*

difference in the means is rejected. On the other hand, if *P*-value < 0.05, then the H_1 is accepted and H_0 is rejected.

Wilcoxon rank sum test - A non-parametric equivalent of Student's t-test

- The test is a non-parametric equivalent of Student's t-test for independent samples, when the assumption of normality is violated. It evaluates the null hypothesis that the two populations are the same against alternative that particular population has larger values than the other. It involves computation of a test statistics based on ranked series. The observations are ranked according to magnitude irrespective of the two groups. The steps involved are as under:

  i) Add the ranks for observations from group 1.

  ii) Since sum of all ranks equal N (N+1)/2, the sum of ranks in group 2 is total sum minus the sum of group 1.

  iii) A statistic U is defined as:

$$U_1 = R_1 - \frac{n_1(n_1+1)}{2}$$

- where n_1 is the size of sample 1 and R_1 is the sum of ranks of sample 1. Equally valid formula for U is

$$U_2 = R_2 - \frac{n_2(n_2+1)}{2}$$

- The smaller of U_1 and U_2 is for significance testing.
- For large sample sizes (N> 30), U is approximately normally distributed, and the standardized value is given by

$$z = \frac{U - m_U}{\sigma_U}$$

- where
- m_U and σ_U are the mean and standard deviation of *U*. The significance of z can be obtained from normal probability tables. Here m_U and σ_U are given by:

$$m_U = \frac{n_1 n_2}{2} \; ; \; \sigma_U = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}$$

Table 1 and Graph 1 provides the age distribution of subjects i.e. expectant mothers. Out of 300 women, 10 (3.33%) were in the age group of 16-20 years,143 (47.67%) were in the age group of 21-25 years, 126 (42%) in the 26-30 years, followed by 21 (7%) women in the greater than 30 years group.

Table 2 and Graph 2 provides the distribution of subjects according to no. of pregnancy. Out of 300 women, 198 (66%) were primigravida, and 102 (34%) women were multigravida

Table 3 and Graph 3 provides the distribution of subjects according to level of education. Out of 300 subjects, 234 (78%) had senior secondary education and above, while 66 (22%) subjects had middle and secondary level of education.

Table 4 and Graph 4 provides the distribution of subjects according to employment. Out of 300 subjects, there were 256 (85.33%) unemployed and 44 (14.67%) were employed.

Table 5 and Graph 5 provides the distribution of subjects according to annual income**.** Out of 300 subjects, There were 3 (1%) subjects with income below 1 lakh/annum, followed by 57 (19%) in the range 1-2 lakh/annum, groups having

income in the range of 2-4 lakh/annum and more than 4 lakh/annum had 119(39.6%) participants each.

Table 6 provides the one way analysis of variance to compare RAPIDD score of subjects in demographic profile. RAPIDD score was significantly different between two groups of education level as indicated by p-value of 0.004 by using independent t-test. Further RAPIDD scores compared for different age groups showed statistically nonsignificant difference with p-value 0.965 by using one way ANOVA. RAPIDD score compared for no. of pregnancy, showed statistically non significant difference with p-value of 0.622. Similarly, RAPIDD score for occupation, annual income showed statistically non significant difference as indicated by p-value > 0.05.

Table 7 provides the comparisons of mother's knowledge about infant oral health care at three different time points. A comparative evaluation of knowledge related questions was performed across baseline, after 1 hour and after 3 months. Knowledge about importance of milk teeth and time of baby's first tooth eruption, showed statistically highly significant difference across times as obtained using *Friedman ANOVA with* P-value of < 0.0001. Mother's knowledge about starting weaning, prolonged night time or at will bottle or breast feeding as the cause of tooth decay showed statistically highly significant difference across time with P-value of < 0.0001.

Further, knowledge about unhealthy diet like chips and biscuits, knowledge regarding cleaning oral cavity after each feeding even before teeth eruption, sharing feeding utensils of child as the cause of transfer of caries causing bacteria, showed statistically highly significant difference across three time points. Knowledge

regarding brushing the baby's teeth and that regarding the use of fluoride to prevent dental problem showed statistically significant difference across time as indicated P-value of < 0.0001. Knowledge regarding types of food which may cause tooth decay also showed highly significant difference across time with P-value of < 0.0001. Mother's knowledge about facts like babies should be given only breast milk for first 6 months of life showed statistically significant difference across time with P-value of 0.015.

Mother's negative response to the question like infant formula is better than breast milk as it contain more nutrients, also showed statistically highly significant difference across time with p-value of < 0.0001. Mothers agreed that most pediatricians give the advice to start giving solid food (cereals, carbohydrates, vegetables, Etc.) showed highly significant difference across time with p-value of < 0.0001. Knowledge regarding use of cloth to clean gum pad of baby, different types of tooth brush for children and type of brushing techniques showed statistically highly significant difference across time points with p-value of < 0.0001.

Table 8 provides the comparison of mother's attitude about infant's oral health care at three different time points. Mother's attitude about knowing the branch of pediatric and preventive dentistry, checking oral health periodically, attitude about taking certain drugs during pregnancy may affect oral health of child, attitude regarding asking a dentist information about maintenance of oral health of child and age of the child for 1st dental visit showed statistically highly significant difference across time as indicated p-value of < 0.0001 by using Friedman ANOVA.

Table 9 provides the comparison of mother's oral health practices according to three different time points using Friedman ANOVA. Frequency of brushing and cleaning teeth, use of floss or other dental aids along with tooth brushing, changing tooth brush, brushing technique showed statistically highly significant difference across times with p-value of < 0.0001.

Also, mother's response about influence of other people on children's oral health, first tooth eruption in a baby's mouth and starting food other than breast milk showed statistically highly significant difference across three time points as indicated p-value of < 0.0001.

Table 10 provides the subjects distribution according to knowledge, attitude and practice scores at three different time points. At baseline, 14 (4.7%) mothers showed over all **good score** (i.e. more than 80% of correct answers) of knowledge, while 145 (48.3%) mothers had **good score** of attitude and 72 (24.0%) mothers showed **good score** of practices. Further, after 1 hour, 245 (81.7%) mothers showed good score of knowledge, while 290 (96.7%) with good score of attitude and 165 (55%) mothers showed good score of practice. After 3 months, 167 (55.7%) mothers showed good score of knowledge, 268 (89.3%) good score of attitude and 113 (37.7%) with good score of practice. A column chart representation of the data is shown in **Graph 6, Graph 7 and Graph 8**

Table 11and Graph 9 provides the comparison for subject's KAP at baseline according to different age categories using Friedman ANOVA. The mean scores for KAP showed statistically non significant difference across age group with p-value of 0.803, 0.799 and 0.965 respectively, implying that there was no difference in mother's knowledge, practice and attitude score across age category at baseline.

Table 12 and Graph 10 provides the comparison for subject's KAP after 1 hour according to different age categories using Friedman ANOVA. The mean scores for KAP showed statistically non significant difference across age groups with p-values 0.407, 0.957 and 0.820 respectively.In other words, there was no difference in mother's KAP scores across age categories after 1 hour.

Table 13 and Graph 11 provides the comparison for subject's KAP after 3 months according to different age categories using Friedman ANOVA. The mean scores for KAP showed statistically non significant difference across age groups with p-values 0.522, 0.421 and 0.657 respectively. In other words, there was no difference in mother's KAP scores across age categories after 3 months.

Table 14and Graph 12provides the comparison of subject's KAP scores at baseline according to education level using Wilcoxon rank sum test. The mean scores for attitude and practice showed statistically significant difference between education levels as indicated p-value of 0.002 and 0.0001 respectively. In other words, there was difference in mother's practice and attitude score between education levels at baseline, while the mean knowledge scores showed no statistical significance.

Table 15 and Graph 13 provides the comparison of subject's KAP scores after 1 hour according to education level using Wilcoxon rank sum test. The mean scores for KAP showed statistically significant difference between education levels as indicated p-value of less than 0.05. In other words, there was statistically significant difference in mother's KAP score between education levels after 1 hour. Mothers with higher qualification scored significantly higher.

Table 16and Graph 14 provides the comparison of subject's KAP after 3 months according to education level using Wilcoxon rank sum test. The mean scores for KAP showed statistically non significant differences across education levels as indicated by p-values 0.262, 0.068 and 0.160 respectively. In other words, there were no differences in mother's KAP scores between two education levels after 3 months.

Table 17 and Graph 15 provides the comparison of subject's KAP at baseline according to no. of pregnancy using Wilcoxon rank sum test. The mean scores for knowledge, attitude showed statistically significant differences between no. of pregnancy, as indicated by p-value of 0.005 and 0.001 respectively. This implied that there was difference in mother's knowledge and attitude score according no. of pregnancy types at baseline. But there was no statistically significant difference in practices according to no. of pregnancy at baseline.

Table 18 and Graph 16 provides the comparison of subject's KAP after 1 hour according to no. of pregnancy using Wilcoxon rank sum test. The mean scores for KAP showed statistically non significant differences according to no. of pregnancy as indicated by p-values more than 0.05. In other words, there was no difference in mother's KAP scores according to no. of pregnancy after 1 hour.

Table 19 and Graph 17 provides the comparison of subject's KAP after 3 months according to gravid types using Wilcoxon rank sum test. The mean scores for KAP showed statistically non significant differences between no. of pregnancy types as indicated p-values more than 0.05.

Table 20 and Graph 18 provides the comparison of subject's KAP at baseline according to occupation using Wilcoxon rank sum test. The mean scores for KAP showed statistically non significant differences between occupation categories as indicated by p-values more than 0.05. In other words, there were no differences in mother's KAP score as regards occupation at baseline.

Table 21 and Graph 19 provides the comparison of subject's knowledge, attitude and practice after 1 hour according to occupation using Wilcoxon rank sum test. The mean scores for practice showed statistically significant difference between occupation categories as indicated by p-value of 0.029. Practice score after 1 hour was higher in employed mothers. Knowledge and attitude score showed statistically non significantly difference between two categories after 1 hour.

Table 22 and Graph 20 provides the comparison of subject's KAP after 3 months according to occupation using Wilcoxon rank sum test. The mean scores for KAP showed statistically non significant difference between occupation categories as indicated by p-values of 0.752, 0.063 and 0.391 respectively.

Table 23 and Graph 21 provides the comparison of subject's KAP at baseline according to income levels using Friedman ANOVA. The mean scores for attitude showed statistically significant differences across income level as indicated by p-value of 0.028. In other words, mother's attitude score was significantly higher in higher income category. The mean knowledge and practice scores showed statistically non significant difference across income levels.

Table 24 and Graph 22 provides the comparison of subject's KAP after 1 hour according to income levels using Friedman ANOVA. The mean scores for KAP

showed statistically non significant differences across income levels as indicated by p-values 0.102, 0.796 and 0.522 respectively.

Table 25 and Graph 23 provides the comparison of subject's KAP after 3 months according to income levels using Friedman ANOVA. The mean scores for KAP showed statistically non significant differences across income levels as indicated by p-values 0.851, 0.481 and 0.486 respectively.

Discussion

The lack of parent education in the prenatal period and the neglect of oral health care in infancy can have far reaching sequelae as during this period the foundation of the permanent teeth and a sound oral health to last for life time is laid down. In the recent years the value of oral health care during infancy has been recognized and infant oral health care programs have been gaining attention globally.[5]

In a developing country like India, a comprehensive assessment of the maternal oral hygiene practices, knowledge, and attitude about infant oral health is essential to plan an effective antenatal dental health education program.[15] This study used a prospective cohort design to examine the effect of motivational interviewing on expectant mothers about infant oral health care. A prospective cohort study is that which follows over time a group of similar individuals (*cohorts*) who differ with

respect to certain factors under study, to determine how these factors affect rates of a certain outcome.

The sample comprised 300 subjects aged from 16 and above, in their second or third trimester of pregnancy. Expectant mothers in their third trimester are more anxious and have more concern for their infants[41]; hence, these mothers are in the right stage to understand how their health would affect their infant's oral health. Expectant mothers from different socio-economic backgrounds and from all parts of the city nearby rural area attend for routine checkups and the majority of deliveries occur in this tertiary care centre, hence the sample can be viewed as being representative of the target population.

The common socioeconomic status indicators used have been income, education and occupation. In the present study education and occupation were chosen. In the present study just over half were between 21 and 25 years of age and the majority were pregnant for the first time. Nearly 78% of the women had completed atleast senior secondary level education and three quarter were housewives indicating that most stayed at home after getting married.

The present study revealed that there was a gap in knowledge attitude and practice amongst expectant mothers seeking antenatal care in a tertiary care centre and this gap can be filled by motivating and training these mothers for infant oral health care with an appropriate educational tool i.e. motivational interviewing

Rapidd scale

The present study showed the percentage of readiness of expectant mothers to accept the motivation and apply the information that is being received by them during the study. The questionnaire included a specific scale, the Readiness Assessment of Parents Concerning Infant Dental Decay (RAPIDD) developed by Weinstein and Reidy . The RAPIDD instrument was validated in a study among families with young children (age 6 to 36 months) in the US Commonwealth of the Northern Mariana Islands, in the Pacific.[10] Once it is evident that the parent is ready to accept any kind of educational intervention regarding their infant oral health care, the next step would be to provide additional motivational.[9]

Based on the Transtheoretical /stages of change model (TTM), this scale was modified to measure expectant mothers 'readiness for change'. The scale is based on Four constructs (Openness to Health Information, Valuing Dental Health, Convenience and Change Difficulty and Child Permissiveness,). It was modified according to the study for expectant mothers and only two constructs were included. I.e. Openness to Health Information, Valuing Dental Health. The scale was assessed for face validity and modified for use with an expectant mother by the examiner. This included rewording of questions relating to bottle-use. These modifications were validated by two subject experts and were approved by the institutional ethical committee. It should be noted that, within the questionnaire, these items are not themed by construct but listed as statements for which the participant is asked to agree with on a 5-point Likert scale (5 = Strongly Agree, 4 = Agree, 3 = Neither agree or disagree, 2 = Disagree, 1 = Strongly Disagree). Mean scores are derived for each of the four RAPIDD constructs.[10]

The analyses did not demonstrate a statistically significant effect of sociodemographic status on the RAPIDD construct scores. There was statistically significant difference found in readiness to change in mothers according to their education. These findings were different from study done by Arteaga P(2009)[9]

Knowledge :

The present study showed no statistically significant correlation between knowledge of expectant mothers and the age of the mothers, this is in accordance with the study by **Thomas A et al. (2015)**[15.] This may have been due to the wide range of ages included in the study.

However **Almoudi MM et al. (2016)**[16] found that mothers in older age groups had better knowledge also study by **Jain R et al. (2014)**[33] found that mothers in the 30- 40 age group had better knowledge.

There was no statistically significant difference seen in knowledge at baseline according to education level of expectant mothers; the reason for finding no significant difference between education level and knowledge regarding infant's oral health care may be because there is always a sharing of knowledge from one prior generation to that of the next generation. So in such cases, even though the mother is not well educated still she will possess basic knowledge about taking care of herself and of her baby. This has also been supported in a study by **Suresh B et al. (2010)**[24] wherein they stated that knowledge is inherited from elders of the family to the younger generation.

On comparison of Knowledge between primigravida and multigravida there was a highly significant difference seen at baseline. With multigravida showing better knowledge this can be accounted to the fact that for primigravida women as she is expecting for the first time may not have enough knowledge about the infant care and is thus considered as a vulnerable group. But due to multiple pregnancies in multigravida women, there is a chance of acquiring knowledge from the health care professionals with each child's birth as well as from the experiences she might have had by neglecting her child's health. This thus makes multigravida stronger in knowledge terms over primigravida. The findings are in accordance with the study done by **Barbieri W et al. (2017)**[49], which also found that multigravida women were having more knowledge regarding antenatal dietary practices as compared to primigravida women. Thus more attention is required to educate primigravida women.

Knowledge regarding importance of primary teeth and maintenance of oral hygiene

In the present study, the questionnaire included questions to assess the knowledge of expectant mothers regarding the importance of primary teeth and oral hygiene habits. The results of the present study showed that respondents had partial knowledge of the importance of deciduous teeth.

About 55% of mothers knew the duration of eruption of 1st primary tooth, this may be, because the present study population consists of both primgravida and multigravida and eruption of baby's1st tooth being a momentous event in the life of a mother , multigravida mothers could recall the time when their child's first tooth erupted into the mouth.

Fifty percent of the mothers had inadequate knowledge about the fact that sharing of utensils can transmit S. mutans which can cause caries in children, and the mode of transmission of cariogenic bacteria appears to be, either direct or indirect. Direct contact is commonly by kissing, so that oral flora is transmitted in saliva; indirect contact occurs via objects such as utensils, which are contaminated with cariogenic bacteria. This is similar to that reported in a study by **Suresh B et al. (2010)**[24]**.**

According to AAPD, the first dental visit should be with the eruption of first primary tooth and no later than twelve months of age. The most alarming finding in the present studywas that only 39.33% mothers knew about baby's 1st dental visit which was in accordance with study by **Sultan S et al. (2016)**[37]. Gynecologists, pediatricians and other medical professionals are more likely to see expecting mothers and infants much earlier than dentists. According to study does by **Subramanium P et al. (2008)**[50] only 36% of paediatricians knew that baby's 1st dental visit should be between 6 and 12 months of life. This disparity of knowledge amongst paediatricians can be a reason for low knowledge of expectant mothers regarding child's 1st dental visit.

Knowledge reagarding prevention of Tooth decay

In our study, knowledge regarding the role of fluoride was poor. This was similar to the study done by **Suresh B et al. (2010)**[24]. Whereas studies done by **Gussy MG et al. (2008)**[22] regarding parental knowledge, beliefs and behaviours for oral health of toddlers residing in rural Victoria in Australia , reported good knowledge about fluoride. The difference can be accounted with the developed and developing country. Since Australia is a developing country it possess various health care

facilities. A special attention is provided to expecting mothers in these countries. Being aware about the right things and following them is set as a norm in these countries. Thus, due to this norm of taking care of infant's oral health and brushing teeth as soon as it erupts in the mouth, the prevalence is found to be high in Australian women. Moreover this study also reports that, though good practices are being followed by them but those are due to the belief prevailing in the society regarding use of fluoridated toothpastes for children especially designed for them as well as the set norms rather than actual behavioural changes.

About 41% of the mothers in the present studycould identify tooth decay as the most common dental disease among children. This was in line with the study by **Jain R et al. (2014)**[33]. And, only 56.76% of mothers believed in cleaning their baby's oral cavity even before eruption of 1st primary tooth. This number was even less than the study done by **Dogra S et al. (2014)**[34]. in the Udaipur city, in which they found that 76% of mothers agreed that it is important to clean an infant's mouth after every feed even before teeth have erupted. This can be directly correlated to the level of education. It has been suggested that the parents with a general, improved level of education may be able to assess appropriate source of information and understand that information more completely.[24]

Only 48.6% mothers would use a finger to clean the gum pads of the baby 46.3% will use cloth. This can be compared with study done by **Nagraj A and Pareek S (2012)**[7] which showed 44.71% mothers used fingers for cleaning gum pads of the baby while 32.5% used gauze. The high level of education among parents of the present studyas compared to the study done by **Nagraj A and Pareek S (2012)**[7]

may be responsible for this difference as higher the education better it becomes to assess the appropriate source of information and understand that information accurately.

Diet and feeding practices

Although 69.33% mothers knew that unhealthy food like chocolate and chips can cause caries, but there was low awareness about the different forms of sugary items, which are harmful to the teeth. This throws the light on inadequate knowledge about the relationship between the different forms of sugar consumption and dental caries. As only 36.3% of mothers knew that both sweet and sticky sweets can cause dental caries. This was in line with **Suresh B et al. (2010)**[24], **Chabra N and Chabra A (2012)**[30] and **Nagraj A and Pareek S (2012)**[7]. All these finding are suggestive of poor knowledge about oral health and indicates the need for an effective oral health education program.

Majority of the respondent did not know the importance of time of intake of sugars. Contrast results were reported by **Sogi HPS et al. (2016)**[38]. They reported that almost 81.5% of parents were aware that consumption of sugar in different forms causing dental caries.

Attitude

There was no statistically significant correlation between the attitude of expectant mothers and the age of the mothers this was in accordance to study by **Thomas A et al. (2015)**[15] however **Almoudi MM et al. (2016)**[16] found that mothers falling in older age groups had a better attitude towards infant oral health care. As discussed before, It's a well-known fact that, as the age advances maturity increases

along. The younger expecting mothers are not in a position to take a decision on their own regarding their as well as infant's oral health care. They are more likely to get influenced by society. The older they get, the independent they become in taking decisions for themselves as well as for the whole family including infants. The independent decision making can be accounted to affect the attitude and the practices of the expecting mothers.

There was a statistically significant difference seen in the attitude of mothers according to educational level, similar results regarding attitude were seen by **Suresh B et al. (2010)**[24]. The reason for this may be, even though the person is having knowledge about a particular thing it does not necessarily mean 'that he/she has adapted to the knowledge. It is just the first step towards bringing change with effort taken from the health professionals' side. But education alone, especially inherited in the family is not enough to bring about behavioral changes in a person towards himself or for the family. There is a need for constant motivation and self-realization to bring about attitude changes. Thus, the change in attitude brings about positive changes in the behavior and practices towards oral health care. **Mitrakul et al. (2012)**[51] also supports that knowledge alone cannot bring about positive changes in practice among parents.

Only 58% of expectant mothers knew that caries in primary teeth may affect permanent teeth ,this was in accordance with the study done by **Sultan et al. (2016)**[37]. Which showed weakness in the knowledge of the effects of caries in primary teeth as they will be replaced.

Tooth decay remains a substantial problem in young children and is made worse by existing barriers that prevent them from obtaining dental care. In the present study75% mothers knew about a pedodontists, which is close to the findings of a study done by **Dogra S et al. (2014)**[34] in Udaipur. The reason behind this percentage may be, this study is conducted in a tertiary care centre where Dental and Medical fraternity work together and multiple awareness campaigns are held in such setups by different departments .

Only 51 % of mothers knew the adverse drug reactions on infant oral health during pregnancy. Which was similar to a study done by **Nagi R et al. (2016)**[52], in this study 22.9% patients took medication without prescription. This could be attributed to poor knowledge and low level of awareness regarding the drugs to be taken during pregnancy as some drugs could affect child development of patient and education by the treating doctor (gynecologist)[52]

The irony on the present studywas that even though a majority 84.6% of mothers agreed that regular dental visit is required for maintenance of good oral health, but still when it actually comes to visiting a dentist various barriers come into the picture. Barriers listed in the literature are accessibility to health care, lack of knowledge among mothers, inability to afford dental treatment cost, lack of time for working parents, negative attitude towards oral health, beliefs associated with deciduous dentition and lack of motivation among parents towards their children's oral health.[32] These barriers thus limit the oral health care practice of mothers' in spite of having enough information. This was in line with the study by **Jain R et al. (2014)**[33]

Maternal oral hygiene practices

We found in the present studythat 36% of the expectant mothers brushed twice daily. The percentage was similar with the study conducted by **Sedky NA et al. (2016)**[53] wherein 43.8% of expectant mothers reported to brush twice a day. However, this Graph was lower when compared to the studies conducted by **Thomas A et al.(2015)**[15]with 64% brushing twice daily. **Ganesh et al. (2011)**[54] reported that 66% of expectant mothers practiced brushing twice daily. The present study also reported that only 31. 33 % of the mothers used any form of interdental aids. This was also less than the study done by **Thomas A et al. (2015)**[15]. Moreover, majority of expectant mothers get no instructions during pregnancy regarding oral health, even though this is a phase of increased acceptance of instructions that should be used as opportunity to introduce preventive programs.[34] The poor hygiene practice can be accounted towards education level and attitude of the mothers in the present study. Though knowledge was enough but still, motivation to make them brush twice was lacking.

KAP

Based on the scoring criteria as described earlier in methodology , it was found that, In the present study 4.7% mothers exhibited good knowledge, 48.3% showed good attitude, and only 24% showed good practices regarding infant oral health care, which shifted to 81.7, 96.7%, 55.0% respectively immediately after 1 hour follow up after the motivational interviewing session. There was a positive effect of motivational interviewing on the study participant, these results were in accordance with the studies conducted by **Naidu R et al. (2010)[10], Weinstein P et al. (2004)[11], Harrison P et al. (2012)[31].**

The results of the present study demonstrate that anticipatory guidance through MI targeting pregnant women was effective in increasing the knowledge and attitudes of these pregnant women regarding infant oral health care. There was a significant increase in the knowledge and attitude levels in the study participants immediately after 1 hr of motivational interviewing.

To the best of our knowledge the present study is one of the few studies which compare the impact of only one session MI (educational intervention) on knowledge attitude and practice through questionnaire, immediately after 1 hr and follow up of the same after 3 months

The present studyresults showed that there was highly statistically significant difference found on knowledge of expectant mothers according to education level 1 hr after MI

Also there is a significant difference in attitude and practice according to educational level of expectant mothers .

These results were similar to a study done by **Shanthini PR et al. (2017)**[55] in which they found a positive impact of anticipatory guidance through power-point presentation to a group of expectant mothers immediately after the intervention, on their knowledge and attitude regarding infant and toddlers oral health care.

There was a positive impact of motivational interviewing on mothers knowledge , attitude and practices in study done by **Naidu R et al. (2010)**[10]. But here the MI was conducted in 4 seesion and the followup was taken after 4 weeks.

The present studyshowed a highly statistically significant difference at 3 time points in knowledge regarding importance of milk teeth, age of weaning, at will/night time breast/bottle feeding practices, role of sugar and other dietary causes of caries, identifying the cavities , role of fluoride in prevention of caries , oral hygiene maintenance practices even before eruption of 1st primary tooth, and age of child's 1st dental visit.

The present studyshowed a highly significant difference at 3 time point in attitude of expectant mothers regarding the awareness to differentiate between a general dentist and a pedodontist, use of drugs without prescription taken during pregnancy which may have adverse reaction on infant oral health , and also taking help from the dentist to improve the dental knowledge.

The present study also showed that there was a highly significant difference at 3 different time points regarding picking up good habits for maintaining good oral hygiene of mothers like – brushing twice daily, using other dental aids for oral hygiene maintenance.

Traditional health education seems to be insufficient in changing parents' behavior, as parents do not go to health professionals in a state of readiness to change patterns of behavior those are well established.[57] Since the 1960s, dental practice has increasingly focused on prevention. Educational methods for the promotion of health have been evaluated, mostly in the form of traditional or unidirectional programs based on informative sessions imparted by health professionals, leaflets, or public media campaigns. This type of approach has not been effective in modifying habits or in reducing the prevalence of caries, since the knowledge gained is only effective over

the short term and is unable to modify behaviors.[35] An alternative innovative method which can be used in passing on the dental health education to the caregivers is motivational interviewing (MI) as it is more focused and goal directed.

Motivational interviewing (MI) is a client-centered but directive approach to counseling. It has been effective for eliciting behavior change in patients in a variety of settings, including patients with issues of substance abuse, diabetes, obesity, and HIV. With MI, the motivation for change comes from the client, but the counselor helps create, by questioning and reflection, the expectation of change. Indeed, the practitioner brings the underlying social determinants of health into the consultation. Feedback and advice are offered within the context of acknowledgment of the client's right to choose. Many possible paths to a solution are provided. Client and counselor agree on a menu of effective behaviors. This strategy is especially appropriate for vulnerable and marginalized populations who are more comfortable if someone suggests ways to think about taking a different approach rather than tells them directly how to act. In the present studythis vulnerable group was expectant mothers who were motivated for a better infant oral health care.[31]

Motivational interviewing

"Motivational Interviewing (MI)" is one novel behavior therapy technique that aims to stimulate patients own motivation for amendment and adherence to treatment.

MI can contribute in constructing new knowledge and to reducing the individual's resistance to change, thus, helps to overcome difficult situations by evoking their motivation to make change in the health behaviors. It can be defined as, "A

collaborative conversation to strengthen a person's own motivation for and commitment to change." Newer definition given by Miller and Rollnick (2013) is "A

person-centered message vogue for addressing the common drawback of ambivalence concerning change".

In the 21st century, health care is focusing on long-term condition management and thus about health behavior change— those things that people can do to improve their health. Literature throws light on the potential use of MI in dental settings.Treatment of early childhood caries, stopping of bottle feeding behaviour, improving patient's compliance during appliance therapy, smoking cessation, improving dental attendance behaviour and altering dietary behaviours can be very well performed through MI.[56]

Advantages of MI counseling.

The MI approach appears to be useful in other dental settings especially periodontal maintenance, in which long-term success rates are low. Since the 1960s, dentistry has become much more holistic and preventive in orientation. With increased awareness of the importance of inter personal relationships, the integration of dental and general health, and improvement of self-care behaviors, the ability to maximize health seems tied to patients' motivation. In addition, we now are aware of the risks of smoking and alert to the effects of systemic diseases (such as diabetes) and other conditions (such as xerostomia) on oral health. However, eliminating harmful habits and establishing protective ones is easier said than done. Health education does not appear to be sufficient. As a result of health professionals' frequent failure in helping patients change their behavior, there is considerable frustration and scepticism among them regarding such attempts. Motivating patients (and, in the case of pediatric patients,

their parents) appears to be a fruitless task that leads initially enthusiastic dental health professionals to a state of burnout. Even the conscientious dentist, dental hygienist or dental assistant routinely runs out of resources. MI may present an answer. The MI approach may be mastered with minimal training; it does not require a health-profession background. MI is appropriate for use by the community health workers frequently found in governmental programs such as Head Start and Women, Infants and Children. Some practice is required.[11]

Telephonic followup

There was a follow-up of participants via telephone contact at 3 month interval. Without follow-up, new behaviours may not be tried out or the new behaviour may be tried out but not maintained. There was a5.3% of dropout in the followup, due to reasons like incorrect phone numbers given by the study participants, and some phone numbers were out of service.

The telephone follow-up was undertaken by the principle investigator. The telephonic followup included reviewing the impact of motivational interviewing with the same questionnaire and the answers were noted .at the end of the phone call, a telephone 'script' was used as in the Weinstein protocol. It was agreed that the script was not to be followed word-for-word but used as a basis / reference point for the telephone conversations.[10] The follow up was also conducted in **Weinstein P et al. (2004)[11]** study wherein parents were called via telephone to reinforce changes and solve any problems. If they faced any problem regarding caries prevention measures , a caries preventive menu was discussed with them as shown in the box given below.

MENU OF CARIES-PREVENTIVE OPTIONS FOR PARENTS.

- Do not let anyone add anything sugary to your child's bottle.
- Clean your baby's teeth as soon as they appear. Cleaning can be done with a small soft toothbrush or face cloth.
- Use a very small amount (smaller than a pea) of fluoride toothpaste.
- Hold your baby when feeding him or her, then lay the baby down to sleep; if the baby awakens, give him or her water, not milk or juice.
- Limit the time your child spends in sipping and snacking, because the longer he or she takes, the greater the chance of decay.
- Use a cup.
- Offer no more than two or three snacks per day.
- Bring your child to the dental clinic at least twice a year so the dentist can protect the baby's teeth by painting a safe fluoride medicine on them.

The parents were motivated to continue with the changed positive behaviour. Similar was noted in **Naidu R et al. (2010)**[10] study which aimed to compare MI with traditional dental health education on knowledge, attitude and behaviours among parents and caregiver of preschool children. They scheduled a follow up at two weeks and one month interval which was carried out by a trained nurse for the same purpose using the protocol mentioned in Wenstein study which was also used in our study. Similar to here, they too reported the importance of follow-up through telephonic calls as the study had a positive effect of parent's and careiver's dental health knowledge towards their children.

There was a steady decline in the percentage of knowledge after the period of 3 months which is in contrast to the study by **Colavara et al. (2018)**[48] the reason behind this is that no reinforcement was given during this period as given by **Colavara et al. (2018)[48].** They aimed to assess the difference in conventional education and motivational interviewing through trained professionals. The only difference with that of the present study was they provided follow up by annual repetition of the same information through the motivational interviewing process. It was a spaced repetition method wherein the same education was given at different time intervals. Reinforcement is one of the most important principles of oral health education, it acts as a booster dose. Moreover, it helps clear doubts of the participants regarding the information provided and additionally motivates them to practice it. Since this was not performed in the present study, it may have accounted for poor knowledge about oral health care among mothers.

A similar study by **Mauricio González-Del-Castillo-McGrath et al. (2014)[35]** showed that in the absence of any new interventions author found a lesser incidence of caries in the experimental group i.e. the motivational interview group, reason being the repetitive reinforcement of motivational interviewing.

Overall mothers showed poor oral health knowledge, attitude and practices. Keeping in mind the changing attitude in society, it is important to plan appropriate oral health programs targeting different groups through the strategies designed for specific requirements. More emphasis should be placed on improving the level of knowledge, which would be reflected in their oral health behavior.

This study was conducted in a tertiary care centre in a municipal city of Maharashtra with convenience sampling method, and hence, the results cannot reflect on the total population of a region. Further studies are needed in which motivational interviewing can be accompanied with additional pamphlets or DVDs giving information regarding infant oral health care in the vernacular languages at periodic interval to the expectant mothers for long term follow-up results

Summary and Conclusion

Summary

This study was conducted in a tertiary care centre in a municipal city of Maharashtra to evaluate the impact of motivational interviewing on knowledge attitude and practice of expectant mothers regarding infant oral health care.

A total of 300 samples of expectant mothers in second and third trimester of pregnancy were evaluated for knowledge attitude and practice regarding infant oral health care.

The RAPPID scale showed that there was a statistically significant difference seen according to educational level of participants, mothers educated beyond the level of senior secondary educations showed more readiness to change the behaviour.

It was found that 4.7% mothers exhibited good knowledge, 48.3% showed good attitude, and only 24% showed good practices at baseline, regarding infant oral health care in the present study.

There was statistically significant difference seen in knowledge according no. of pregnancy only.

There was statistically significant difference seen in attitude according educational level and no. of pregnancy.

There was statistically significant difference seen in oral hygiene practices of mothers according to education level.

The overall KAP score shifted to 81.7, 96.7%, 55.0% respectively immediately after 1 hour follow up after the motivational interviewing session. There was a positive effect of motivational interviewing on the study participant.

However, the three month follow up of KAP score showed a steady decline upto 55.7%, 89.3% and 37.7% respectively, due to lack of reinforcements given to the participants.

Conclusion

Cultural influences, competing pressures and perceptions of hereditary influences, together with a lack of contemporary oral health knowledge are the main factors affecting oral health knowledge, attitude and practice of expectant mothers. The RAPPID scale is a valuable instrument that will aid the practitioner in determining whether a parent is likely to apply the information he or she has received.

Motivational interviewing is one educational tool which provides not only information but also gives options to solve any problem arising in applying that information. It brings about the behavioural change from within the person and not just the superficial acceptance of the information.

This method of instruction provides the least intimidating and most responsive form ofinteraction between the practitioner and parent. It allows for free discussion about concernsand leaves the parents at ease about their child's oral health. In conclusion, this study hasshown that with the proper educational tools parents are able to accept and improve theirknowledge related to infant oral health care.

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Tables

Table 1: Age distribution of subjects (expected mothers)

Age	No.	%
16-20 years	10	3.33
21-25 years	143	47.67
26-30 years	126	42.00
> 30	21	7.00

Table 2: Distribution of subjects according to number of children

Number of children	No.	%
Primigravida	198	66.00
Multigravida	102	34.00

Table 3: Distribution of subjects according to level of education

Level of education	No.	%
Middle and secondary education	66	22.00
Senior secondary, graduate and above	234	78.00

Table 4: Distribution of subjects according to occupation

Occupation	No.	%
Housewife	256	85.33
Employed	44	14.67

Table 5: Distribution of subjects according to annual income

Annual income (per annum)	No.	%
Less than 1 lakh	3	1.00
1-2 lakh	57	19.00
2-4 lakh	119	39.67
More than 4 lakh	119	39.67

Table 6: Comparison of demographic profile of subjects with RAPIDD score

Variables	**RAPIDD score**			**P-value**
	N	**Mean**	**SD**	
Age				
16-20 years	10	35.50	3.54	0.965 (NS)*
21-25 years	143	35.67	4.33	
26-30 years	126	35.59	5.06	
More than 30 years	21	36.14	4.43	
Number of pregnancy				
Primigravida	198	35.61	4.62	0.622 (NS)*
Multigravida	102	35.85	4.68	
Level of education				
Middle and secondary education	66	34.23	6.11	**0.004 (S)**[Ŧ]
Senior secondary, graduate and above	234	36.07	4.02	
Occupation				
Housewife	256	35.68	4.76	0.911 (NS)[Ŧ]
Employed	44	35.59	3.69	
Annual income				
Less than 1 lac per annum	3	35.67	4.73	0.606 (NS)*
1-2 lac per annum	57	34.91	4.87	
2-4 lac per annum	119	35.83	4.85	
More than 4 lac per annum	119	35.85	4.29	
History of miscarriage				
Yes	52	36.56	3.98	0.125 (NS)*
No	248	35.48	4.72	

*Obtained using *ANOVA*; [Ŧ] obtained using *independent t-test*; S: Significant; NS: Not Significant

Table 7: Knowledge of subjects about infant's oral hygiene at three different time points

Knowledge		**Test Type**						**P-value***
		Baseline		**After 1 Hr.**		**After 3 Months**		
		No.	**%**	**No.**	**%**	**No.**	**%**	
Q1: Do you know there are two sets of teeth – milk teeth and permanent teeth?	*Yes*	294	98.00	297	99.00	299	99.67	0.999 (NS)
	No	3	1.00	1	0.33	1	0.33	
	May be	3	1.00	2	0.67	0	0.00	
Q2: Are milk teeth important?	*Yes*	243	81.00	288	96.00	289	96.33	< **0.0001 (S)**
	No	45	15.00	6	2.00	11	3.67	
	May be	12	4.00	6	2.00	0	0.00	
Q3: When does the first tooth erupt in a baby's mouth?	*4-6 Months*	54	18.00	3	1.00	15	5.00	**0.001 (S)**
	6-10 Months	165	55.00	293	97.67	281	93.67	
	10-13 Months	79	26.33	3	1.00	4	1.33	
	13-15 Months	2	0.67	1	0.33	0	0.00	
Q4: When should one include other food to an infant's diet other than breastmilk?	*6 months*	164	54.67	280	93.33	279	93.00	< **0.0001 (S)**
	1 year	128	42.67	18	6.00	21	7.00	
	3 years	5	1.67	1	0.33	0	0.00	
	Don't know	3	1.00	1	0.33	0	0.00	
Q5: Frequent and prolonged breast/bottle feeding during sleep can cause tooth decay?	*Yes*	125	41.67	287	95.67	283	94.33	< **0.0001 (S)**
	No	55	18.33	4	1.33	7	2.33	
	May be	120	40.00	9	3.00	10	3.34	
Q6: Unhealthy diet e.g.	*Yes*	208	69.3	295	98.33	28	95.6	<

Knowledge		**Test Type**						**P-value***
		Baseline		**After 1 Hr.**		**After 3 Months**		
		No.	**%**	**No.**	**%**	**No.**	**%**	
sweets, biscuits and chips can affect a child's milk teeth and adult teeth?			3			7	7	**0.0001 (S)**
	No	15	5.00	0	0.00	2	0.67	
	May be	77	25.67	5	1.67	11	3.67	
Q7*:* The mouth of the baby should be cleaned after each feeding even before the teeth erupt?	*Yes*	170	56.67	290	96.67	274	91.33	**< 0.0001 (S)**
	No	99	33.00	7	2.33	7	2.34	
	May be	31	10.33	3	1.00	19	6.33	
Q8: Do you think sharing feeding utensils of child will cause transfer of caries causing bacteria?	*Yes*	152	50.67	280	93.33	266	88.67	**< 0.0001 (S)**
	No	30	10.00	2	0.67	9	3.00	
	May be	118	39.33	18	6.00	25	8.33	
Q9: Can you identify caries/cavities in your child's teeth?	*Yes*	125	41.67	223	74.33	167	55.67	**< 0.0001 (S)**
	No	134	44.67	36	12.00	88	29.33	
	May be	41	13.67	41	13.67	45	15.00	
Q10: Does brushing the teeth prevent dental problem?	*Yes*	282	94.00	296	98.67	282	94.00	**< 0.0001 (S)**
	No	3	1.00	3	1.00	12	4.00	
	Don't know	15	5.00	1	0.33	6	2.00	
Q11: Does fluoride prevents the decay of teeth?	*Yes*	73	24.33	251	83.67	138	46.00	**< 0.0001 (S)**
	No	55	18.33	13	4.33	76	25.33	
	Don't know	172	57.33	36	12.00	86	28.67	

Knowledge		Test Type						P-value*
		Baseline		After 1 Hr.		After 3 Months		
		No.	%	No.	%	No.	%	
Q12: Which types of food can cause tooth decay?	*Sweet*	120	40.00	12	4.00	12	4.00	< **0.0001 (S)**
	Sticky	64	21.33	3	1.00	54	18.00	
	Both sweet and sticky	109	36.33	283	94.33	233	77.67	
	None of the above	7	2.33	2	0.67	1	0.33	
Q13: Babies should be given only breast milk for first 6 months of life?	*Yes*	286	95.33	294	98.00	295	98.33	**0.015 (S)**
	No	9	3.00	2	0.67	1	0.34	
	Don't know	5	1.67	4	1.33	4	1.33	
Q14: Infant formula is better than breast milk as it contains more nutrients than breast milk?	*Yes*	131	43.67	165	55	193	64.33	< **0.0001(S)**
	No	52	17.33	118	39.33	88	29.33	
	Don't know	117	39	17	5.67	19	6.33	
Q15: Most pediatricians agree with the advice to start giving solid food (cereals, carbohydrates, vegetables,Etc.) ?	*3 months*	15	5.00	4	1.33	20	6.67	< **0.0001 (S)**
	6 months	202	67.33	287	95.67	273	91.00	
	8 months	71	23.67	8	2.67	7	2.33	
	10 months	12	4.00	1	0.33	0	0.00	
Q16: Using a cup instead of bottle will help reduce dental caries?	*Yes*	155	51.67	281	93.67	283	94.33	0.118 (NS)
	No	66	22	10	3.33	11	3.67	
	Don't	79	26.3	9	3.00	6	2.00	

Knowledge		**Test Type**						**P-value***
		Baseline		**After 1 Hr.**		**After 3 Months**		
	know	**No.**	**%** 3	**No.**	**%**	**No.**	**%**	
Q17: What will you use to clean the gum pads of your baby?	*Finger*	146	48.67	17	5.67	27	9.00	< **0.001 (S)**
	Cloth	139	46.33	283	94.33	271	90.33	
	Any other aid	15	5.00	0	0.00	2	0.67	
Q18: What different type of tooth brush you know for children?	*Children / Junior*	106	35.33	111	37.00	138	46.00	< **0.001 (S)**
	Baby brush/finger brush	106	35.33	91	30.33	148	49.33	
	Powered brush	8	2.67	12	4.00	45	15.00	
	All of the above	55	18.33	135	45.00	110	36.67	
	Don't know	43	14.33	10	3.33	1	0.33	
Q19: Which type of brushing technique should be followed to clean teeth of children?	*Horizontal*	150	50.00	108	36.00	91	30.33	< **0.001 (S)**
	Vertical	27	9.00	32	10.67	53	17.67	
	Circular	69	23.00	139	46.33	210	70.00	
	Combination	53	17.67	33	11.00	25	8.33	
	Don't know	8	2.67	0	0.00	2	0.67	

*Obtained using *Friedman test*; S: Significant; NS: Not Significant

Table 8: Attitude of subjects about infant's oral hygiene at three different time point

Attitude		**Test Type**						**P-value***
		Baseline		**After 1 Hr.**		**After 3 Months**		
		No.	**%**	**No.**	**%**	**No.**	**%**	
Q20: Do you know there is branch like pediatric and preventive dentistry?	*Yes*	225	75.00	294	98	265	88.33	**< 0.0001 (S)**
	No	50	16.67	4	1.33	7	2.34	
	Don't know	25	8.33	2	0.67	28	9.33	
Q21: Do you believe in checking your oral health status periodically ?	*Yes*	254	84.67	293	97.67	289	96.33	**0.001 (S)**
	No	34	11.33	5	1.66	7	2.34	
	Don't know	12	4.00	2	0.67	4	1.33	
Q22: Are you aware of some drugs which if consumed during pregnancy may have adverse effect on your child's oral health and teeth?	*Yes*	153	51.00	285	95	266	88.67	**< 0.0001 (S)**
	No	95	31.67	12	4	4	1.33	
	Don't know	52	17.33	3	1.00	30	10.00	
Q23: Oral health has to be maintained for a good general body health	*Yes*	181	60.33	289	96.33	286	95.33	0.313 (NS)
	No	63	21.00	5	1.67	3	1	
	Don't know	56	18.67	6	2.00	11	3.67	
Q24: Can problems of	*Yes*	174	58.00	293	97.66	290	96.67	0.124 (NS)
	No	73	24.33	5	1.67	6	2	

Attitude		Test Type						P-value*
		Baseline		After 1 Hr.		After 3 Months		
		No.	%	No.	%	No.	%	
primary teeth affect the permanent teeth?	*Don't know*	53	17.67	2	0.67	4	1.33	
Q25: Do you expect any help from your dentist regarding maintenance of oral health of your child?	*Yes*	217	72.33	292	97.33	280	93.33	**< 0.0001 (S)**
	No	57	19.00	4	1.34	8	2.67	
	May be	26	8.67	4	1.33	12	4.00	
Q26: What is the ideal time for a child's 1st dental checkup visit ?	*Before 1 year*	118	39.33	273	91.00	232	77.34	**< 0.0001 (S)**
	1-2 year	92	30.67	19	6.33	60	20	
	3 year	53	17.67	5	1.67	4	1.33	
	Don't know	37	12.33	3	1.00	4	1.33	

*Obtained using *Friedman test*; S: Significant; NS: Not Significant

Table 9: Subject's oral health practice at three different time points

Practice		**Test Type**						**P-value***
		Baseline		**After 1 Hr.**		**After 3 Months**		
		No.	**%**	**No.**	**%**	**No.**	**%**	
Q27: How many times in a day do you brush/clean your teeth?	*Once*	189	63.00	140	46.67	165	55	**< 0.0001 (S)**
	Twice	110	36.67	157	52.33	133	44.33	
	After every meal	0	0.00	3	1.00	2	0.67	
	Never	1	0.33	0	0.00	0	0.00	
Q28: Do you use floss or other dental aids(tongue cleaner) along with tooth brushing?	*Yes*	96	32	160	53.33	150	50.00	**< 0.0001 (S)**
	No	195	65.00	135	45.00	131	43.66	
	May be	9	3.00	5	1.67	19	6.34	
Q29: When do you change your toothbrush?	*When color of bristle change*	24	8.00	17	5.67	54	18.00	**< 0.001 (S)**
	When bristles wear off	104	34.67	42	14.00	73	24.33	
	Every 3 months	168	56.00	246	82.00	188	62.67	
	Don't know	7	2.33	0	0.00	9	3.00	
Q30: What different type of tooth brush you know for adults?t	*Soft*	108	36.00	120	40.00	100	33.33	0.144 (NS)
	Super soft	30	10.00	21	7.00	68	22.67	
	Medium	86	28.67	61	20.33	141	47.00	
	Hard	20	6.67	20	6.67	37	12.33	
	All of the above	65	21.67	108	36.00	47	15.67	
	Don't know	27	9.00	9	3.00	0	0.00	
Q31: Which type of brushing technique you follow to clean your teeth ?	*Horizontal*	155	51.67	179	59.67	150	50.00	**< 0.001 (S)**
	Vertical	47	15.67	80	26.67	70	23.33	
	1:Circular	55	18.33	30	10.00	117	39.00	
	Combination	68	22.67	71	23.67	58	19.33	
	0:Don't know	2	0.67	0	0.00	2	0.67	
Q32: Do you visit dentist for the treatment of your dental problems?	*Yes*	229	76.33	249	83	271	90.33	0.844 (NS)
	No	36	12.00	29	9.67	17	5.67	

Practice		Test Type						P-value*
		Baseline		After 1 Hr.		After 3 Months		
		No.	%	No.	%	No.	%	
	Sometimes	35	11.67	22	7.33	12	4.00	
Q33 Are there other people who influence your dental care decision taken for your child	*Yes*	203	67.67	243	81	223	74.33	**0.011 (S)**
	No	46	15.33	21	7	47	15.67	
	Sometimes	51	17.00	36	12.00	30	10.00	
Q34: When does the first tooth erupt in a baby's mouth?	*4-6 months*	52	17.33	14	4.67	56	18.67	**< 0.001 (S)**
	6-10 months	203	67.67	283	94.33	239	79.67	
	10-13 months	44	14.67	3	1.00	5	1.66	
	13-15 months	1	0.33	0	0.00	0	0.00	
Q35: When should one include other food to an infant's diet other than breastmilk?	*6 months*	216	72.00	285	95.00	272	90.67	**< 0.001 (S)**
	1 years	80	26.67	14	4.67	26	8.67	
	3 years	2	0.66	1	0.33	2	0.66	
	Don't know	2	0.67	0	0.00	0	0.00	

*Obtained using *Friedman test*; S: Significant; NS: Not Significant

Table 10: Distribution of subject's knowledge, attitude and practice according to three time point

	Level	Baseline (n=300)		After 1 Hr. (n=300)		After 3 Mo. (n=300)	
		No.	%	No.	%	No.	%
Knowledge	Good	14	4.7%	245	81.7%	167	55.7%
	Fair	161	53.7%	48	16.0%	133	44.3%
	Poor	125	41.7%	7	2.3%	0	0.0%
Attitude	Good	145	48.3%	290	96.7%	268	89.3%
	Fair	67	22.3%	6	2.0%	29	9.7%
	Poor	88	29.3%	4	1.3%	3	1.0%
Practice	Good	72	24.0%	165	55.0%	113	37.7%
	Fair	170	56.7%	126	42.0%	176	58.7%
	Poor	58	19.3%	9	3.0%	11	3.7%

Table 11: Comparison of subject's knowledge, attitude and practice score according to age category at baseline

Baseline	Age (Years)								P-value*
	16-20 (n=10)		21-25 (n=143)		26-30 (n=126)		> 30 (n=31)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Knowledge score	11.20	3.12	10.20	3.11	10.13	3.51	10.05	3.81	0.803 (NS)
Attitude score	4.50	2.22	4.05	1.92	3.92	1.84	4.00	1.87	0.799 (NS)
Practice score	5.10	1.52	5.17	1.60	5.07	1.95	5.24	2.32	0.965 (NS)

*Obtained using *ANOVA*; NS: Not Significant

Table 12: Comparison of subject's knowledge, attitude and practice score according to age category after 1 hour

After 1 hr.	Age (Years)								P-value*
	16-20 (n=10)		21-25 (n=143)		26-30 (n=126)		> 30 (n=31)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Knowledge score	17.40	1.07	16.57	1.99	16.35	2.18	16.43	1.29	0.407 (NS)
Attitude score	5.90	0.32	5.81	0.64	5.81	0.68	5.76	0.54	0.957 (NS)
Practice score	6.20	1.03	6.59	1.37	6.57	1.39	6.43	1.63	0.820 (NS)

*Obtained using *ANOVA*; NS: Not Significant

Table 13: Comparison of subject's knowledge, attitude and practice score according to age category after 3 months

After 3 months	Age (years)								P-value*
	16-20 (n=10)		21-25 (n=143)		26-30 (n=126)		> 30 (n=31)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Knowledge score	16.20	1.40	15.45	1.94	15.62	1.81	15.86	1.93	0.522 (NS)
Attitude score	5.80	0.63	5.50	0.91	5.63	0.82	5.67	0.58	0.421 (NS)
Practice score	5.50	0.97	6.02	1.38	5.93	1.43	6.10	1.41	0.657 (NS)

*Obtained using *ANOVA*; NS: Not Significant

Table 14: Comparison of subject's knowledge, attitude and practice score according to education level at baseline

Baseline	Education level				P-value*
	Middle and secondary Education (n=66)		Senior secondary, graduate and above (n=234)		
	Mean	SD	Mean	SD	
Knowledge score	9.50	3.58	10.39	3.23	0.055 (NS)
Attitude score	3.36	2.02	4.19	1.82	**0.002 (S)**
Practice score	4.35	1.86	5.35	1.72	**< 0.0001 (S)**

*Obtained using *independent t-test*; S: Significant; NS: Not Significant

Table 15: Comparison of subject's knowledge, attitude and practice score according to education level after 1 hour

After 1 hr.	Education level				P-value*
	Middle and secondary Education (n=66)		Senior secondary, graduate and above (n=234)		
	Mean	SD	Mean	SD	
Knowledge score	15.73	2.63	16.71	1.75	**< 0.0001 (S)**
Attitude score	5.64	0.97	5.86	0.50	**0.012 (S)**
Practice score	6.05	1.59	6.70	1.29	**0.001 (S)**

*Obtained using *independent t-test*; S: Significant

Table 16: Comparison of subject's knowledge, attitude and practice score according to education level after 3 months

After 3 months	Education level				P-value*
	Middle and secondary Education (n=66)		Senior secondary, graduate and above (n=234)		
	Mean	SD	Mean	SD	
Knowledge score	15.35	1.97	15.64	1.84	0.262 (NS)
Attitude score	5.41	1.10	5.62	0.76	0.068 (NS)
Practice score	5.76	1.56	6.03	1.33	0.160 (NS)

*Obtained using *independent t-test*; NS: Not Significant

Table 17: Comparison of subject's knowledge, attitude and practice score according to no. of pregnancy at baseline

Baseline	No. of pregnancy				P-value*
	Primigravida (n=198)		Multigravida (n=102)		
	Mean	SD	Mean	SD	
Knowledge score	9.45	3.54	10.58	3.14	**0.005 (S)**
Attitude score	3.52	1.91	4.26	1.84	**0.001 (S)**
Practice score	4.91	1.86	5.24	1.76	0.131 (NS)

*Obtained using *independent t-test*; S: Significant; NS: Not Significant

Table 18: Comparison of subject's knowledge, attitude and practice score according to no. of pregnancy after 1 hour

After 1 hr.	No. of pregnancy				P-value*
	Primigravida (n=198)		Multigravida (n=102)		
	Mean	SD	Mean	SD	
Knowledge score	16.52	1.44	16.48	2.26	0.888 (NS)
Attitude score	5.75	0.70	5.84	0.61	0.285 (NS)
Practice score	6.42	1.31	6.63	1.42	0.225 (NS)

*Obtained using *independent t-test*; NS: Not Significant

Table 19: Comparison of subject's knowledge, attitude and practice score according to no. of pregnancy after 3 months

After 3 months	No. of pregnancy				P-value*
	Primigravida (n=198)		Multigravida (n=102)		
	Mean	SD	Mean	SD	
Knowledge score	15.33	1.93	15.70	1.83	0.105 (NS)
Attitude score	5.54	0.99	5.60	0.76	0.582 (NS)
Practice score	5.79	1.38	6.06	1.39	0.116 (NS)

*Obtained using *independent t-test*; NS: Not Significant

Table 20: Comparison of subject's knowledge, attitude and practice score according to occupation at baseline

Baseline	Occupation				P-value*
	Employed (n=44)		Housewife (n=256)		
	Mean	SD	Mean	SD	
Knowledge score	10.43	3.67	10.15	3.26	0.607 (NS)
Attitude score	4.20	2.06	3.97	1.86	0.453 (NS)
Practice score	5.45	1.87	5.07	1.78	0.195 (NS)

*Obtained using *independent t-test*; NS: Not Significant

Table 21: Comparison of subject's knowledge, attitude and practice score according to occupation after 1 hour

After 1 hr.	Occupation				P-value*
	Employed (n=44)		Housewife (n=256)		
	Mean	SD	Mean	SD	
Knowledge score	16.73	2.23	16.46	1.98	0.412 (NS)
Attitude score	5.80	0.79	5.81	0.61	0.871 (NS)
Practice score	6.98	1.17	6.48	1.41	**0.029 (S)**

*Obtained using *independent t-test*; S: Significant; NS: Not Significant

Table 22: Comparison of subject's knowledge, attitude and practice score according to occupation after 3 months

After 3 months	Occupation				P-value*
	Employed (n=44)		Housewife (n=256)		
	Mean	SD	Mean	SD	
Knowledge score	15.66	1.64	15.56	1.91	0.752 (NS)
Attitude score	5.80	0.59	5.54	0.88	0.063 (NS)
Practice score	6.14	1.30	5.94	1.40	0.391 (NS)

*Obtained using *independent t-test*; S: Significant

Table 23: Comparison of subject's knowledge, attitude and practice score according to income level at baseline

Baseline	Income level (per annum)								P-value*
	< 1 lakh (n=3)		1-2 lakh (n=57)		2-4 lakh (n=119)		> 4 lakh (n=119)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Knowledge score	9.00	4.36	10.54	3.28	9.74	3.35	10.50	3.30	0.241 (NS)
Attitude score	2.00	3.46	3.95	1.82	3.75	2.00	4.33	1.73	**0.028 (S)**
Practice score	3.67	2.52	4.81	1.78	5.13	1.78	5.31	1.79	0.168 (NS)

*Obtained using *ANOVA*; S: Significant; NS: Not Significant

Table 24: Comparison of subject's knowledge, attitude and practice score according to income level after 1 hour

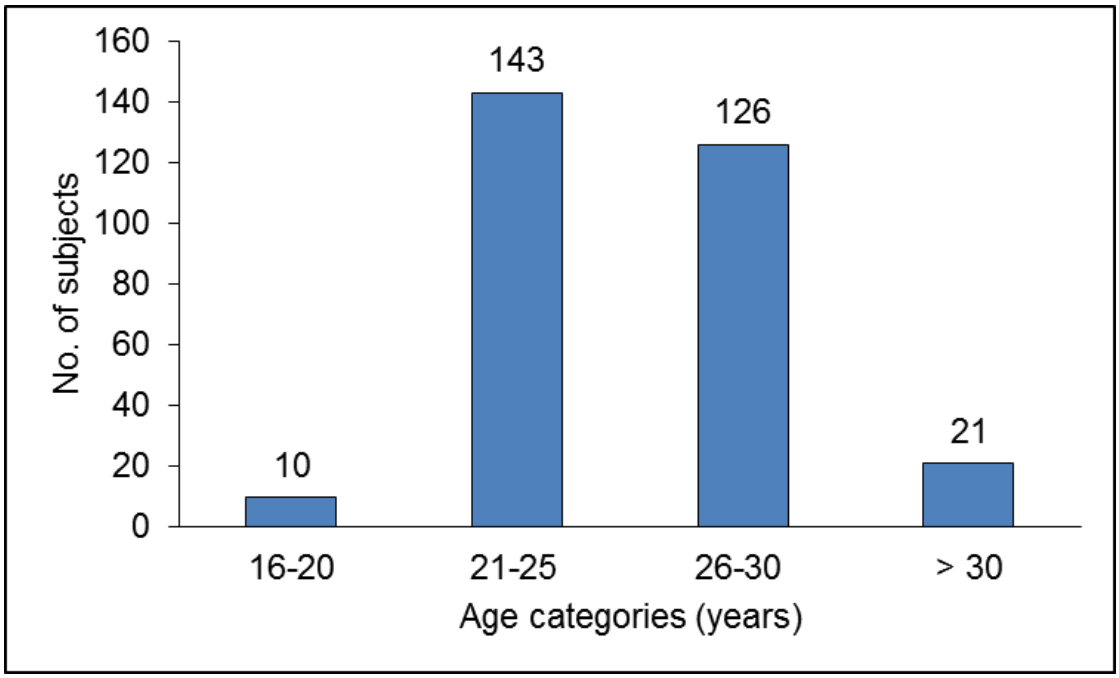
After 1 hr.	Income level (per annum)								P-value*
	< 1 lakh (n=3)		1-2 lakh (n=57)		2-4 lakh (n=119)		> 4 lakh (n=119)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Knowledge score	14.67	3.06	16.42	2.29	16.29	2.18	16.78	1.63	0.102 (NS)
Attitude score	5.67	0.58	5.86	0.40	5.77	0.80	5.83	0.56	0.796 (NS)
Practice score	6.00	2.00	6.37	1.41	6.55	1.41	6.66	1.33	0.522 (NS)

*Obtained using *ANOVA*; NS: Not Significant

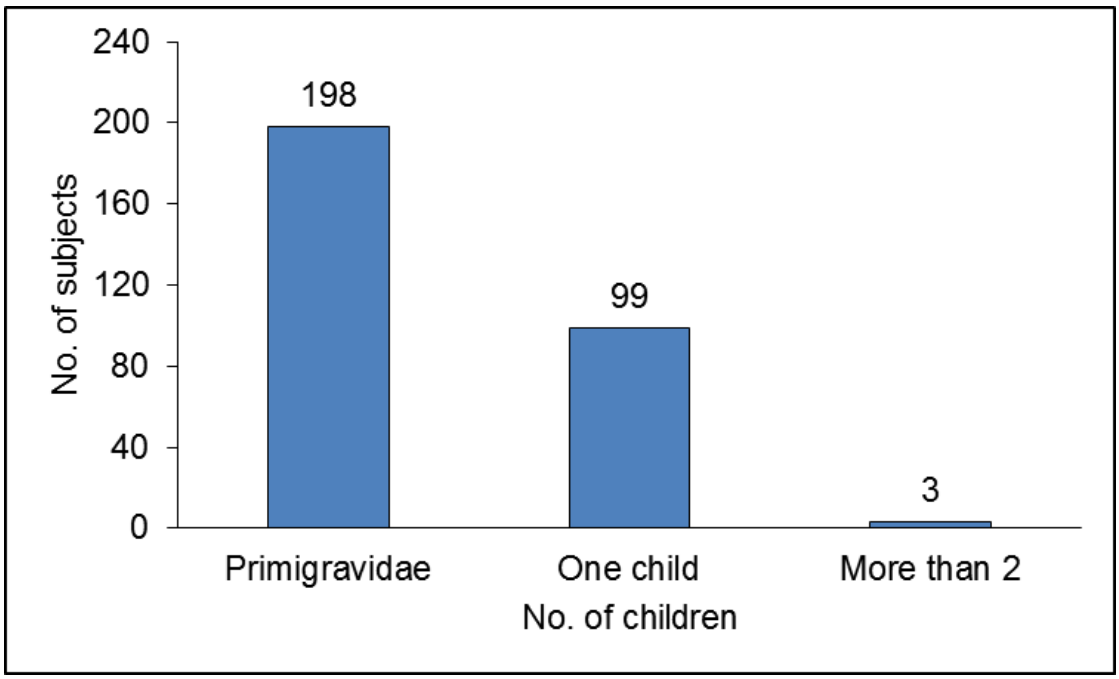
Table 25: Comparison of subject's knowledge, attitude and practice score according to income level after 3 months

After 3 months	Income level (per annum)								P-value*
	< 1 lakh (n=3)		1-2 lakh (n=57)		2-4 lakh (n=119)		> 4 lakh (n=119)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Knowledge score	15.33	0.58	15.75	1.78	15.57	1.76	15.50	2.01	0.851 (NS)
Attitude score	6.00	0.00	5.65	0.69	5.61	0.71	5.50	1.02	0.481 (NS)
Practice score	6.67	0.58	5.75	1.29	6.04	1.36	5.97	1.48	0.486 (NS)

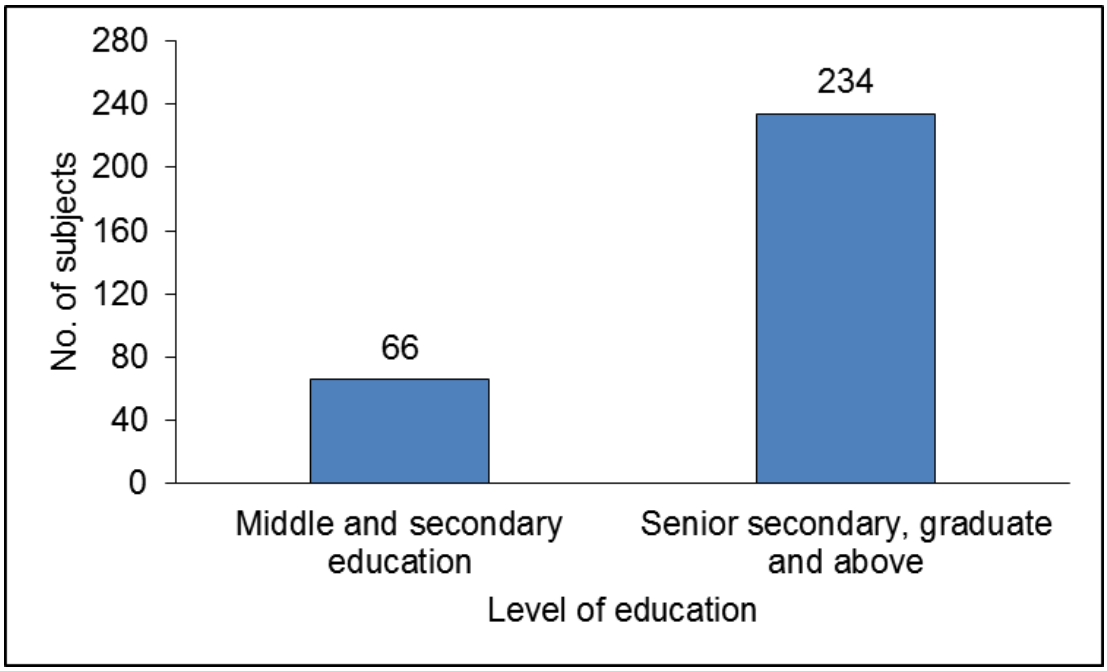
*Obtained using *ANOVA*; NS: Not Significant



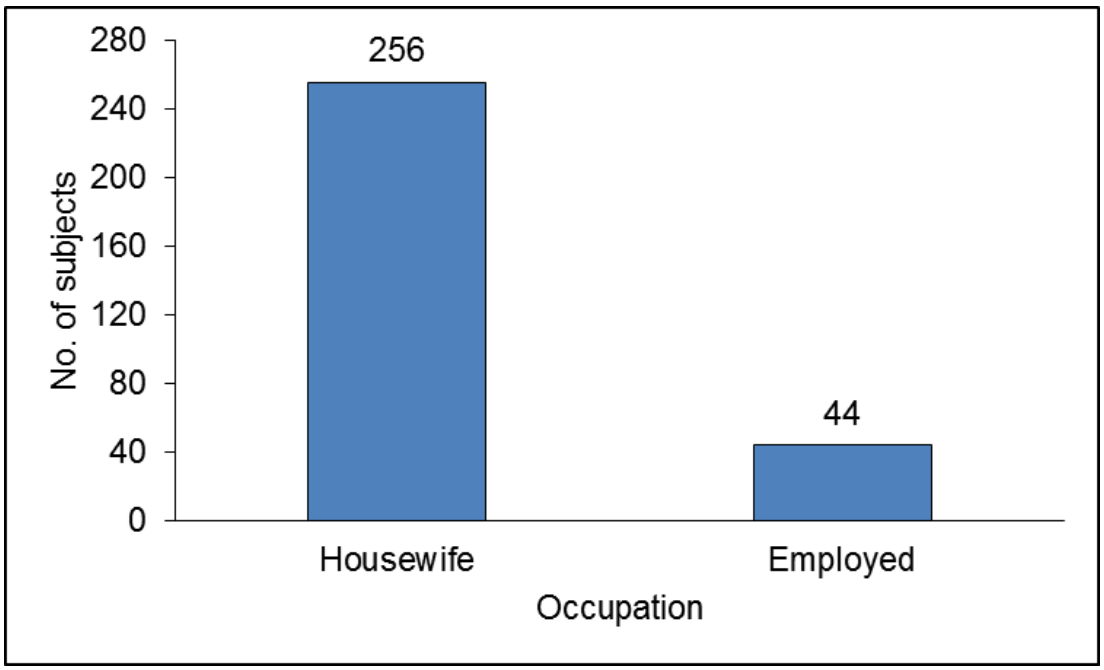
Graph 1: Column chart showing number of subjects according to different age categories



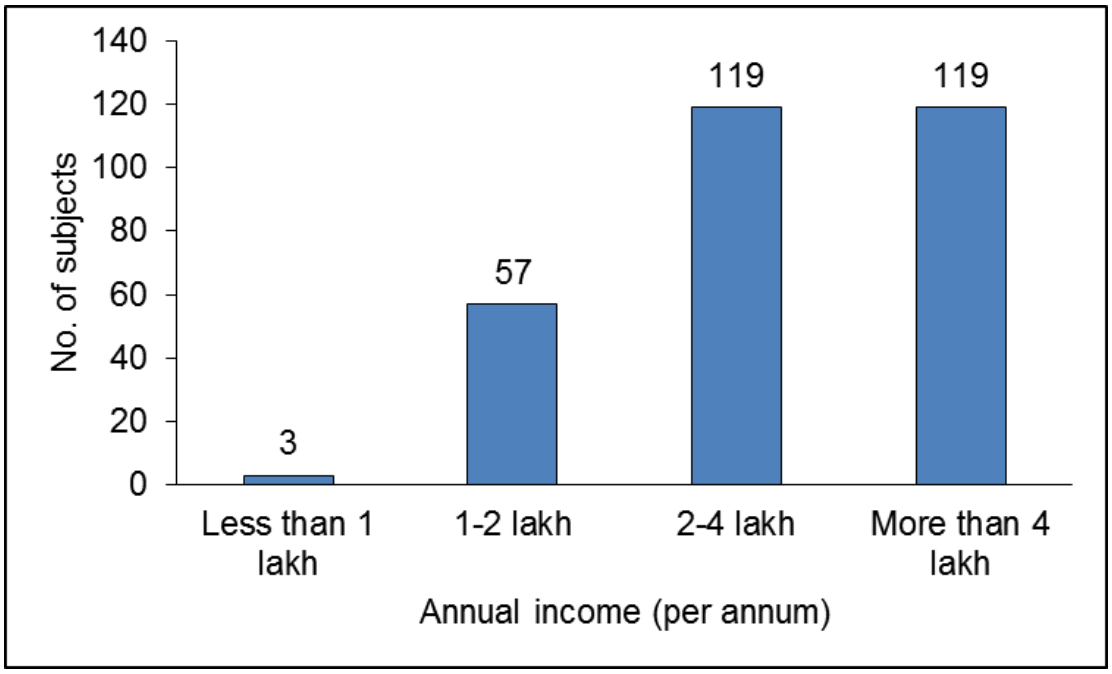
Graph 2: Column chart showing number of subjects according to number of children



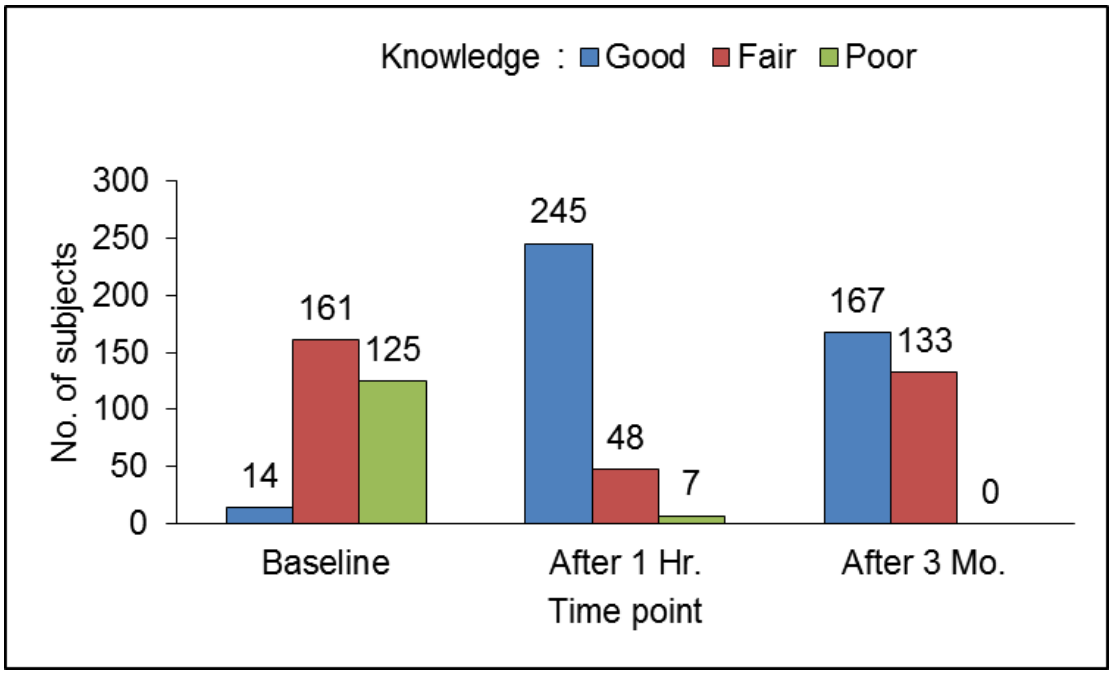
Graph 3: Column chart showing number of subjects according to education level



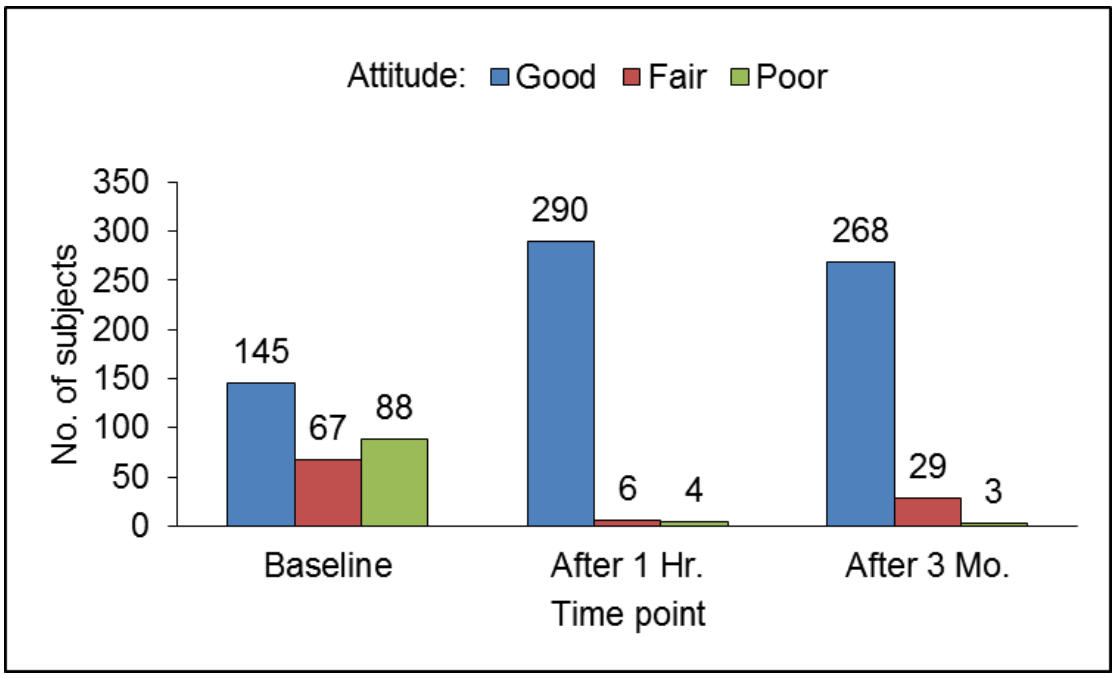
Graph 4: Column chart showing number of subjects according to occupation



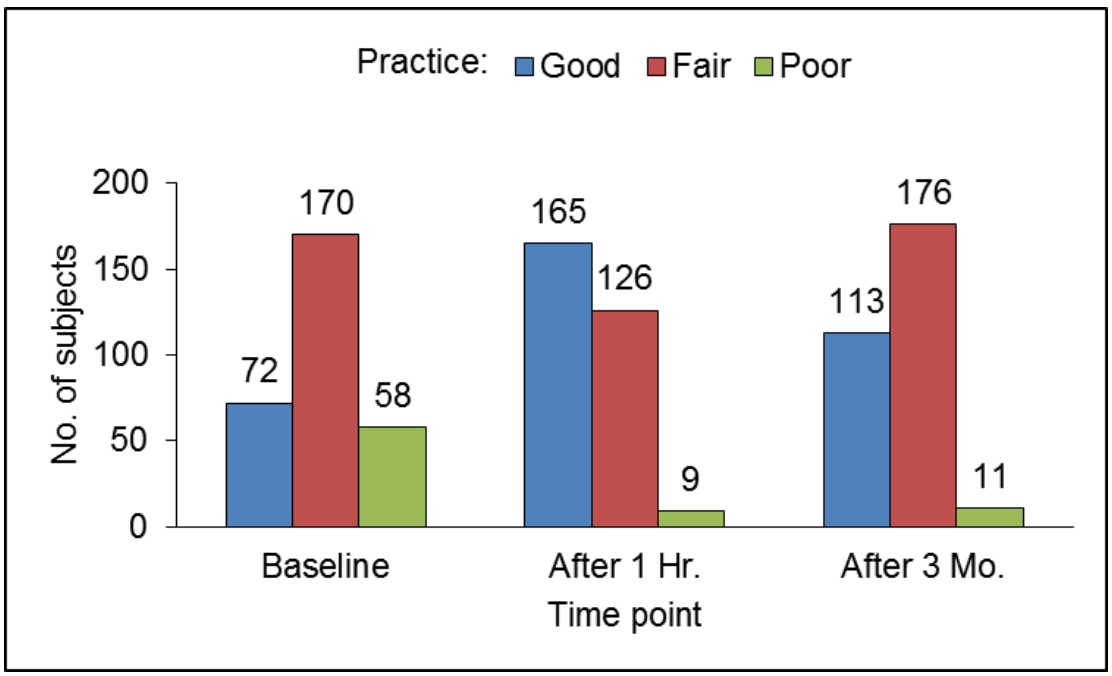
Graph 5: Column chart showing number of subjects according to annual income



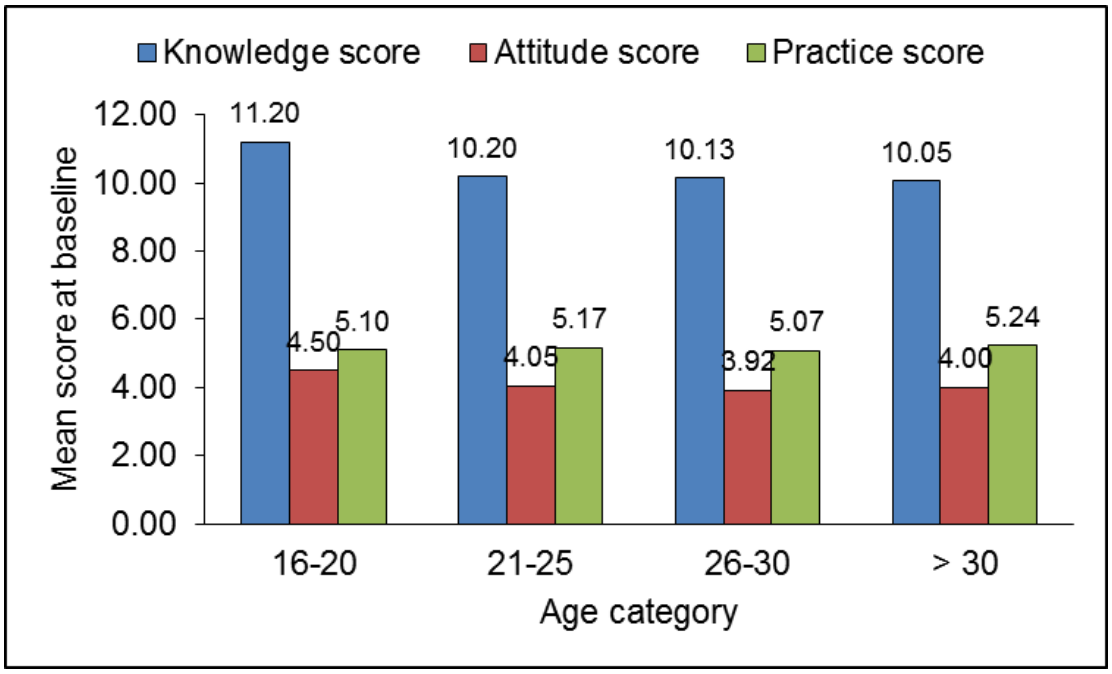
Graph 6: Column chart showing number of subjects according to knowledge



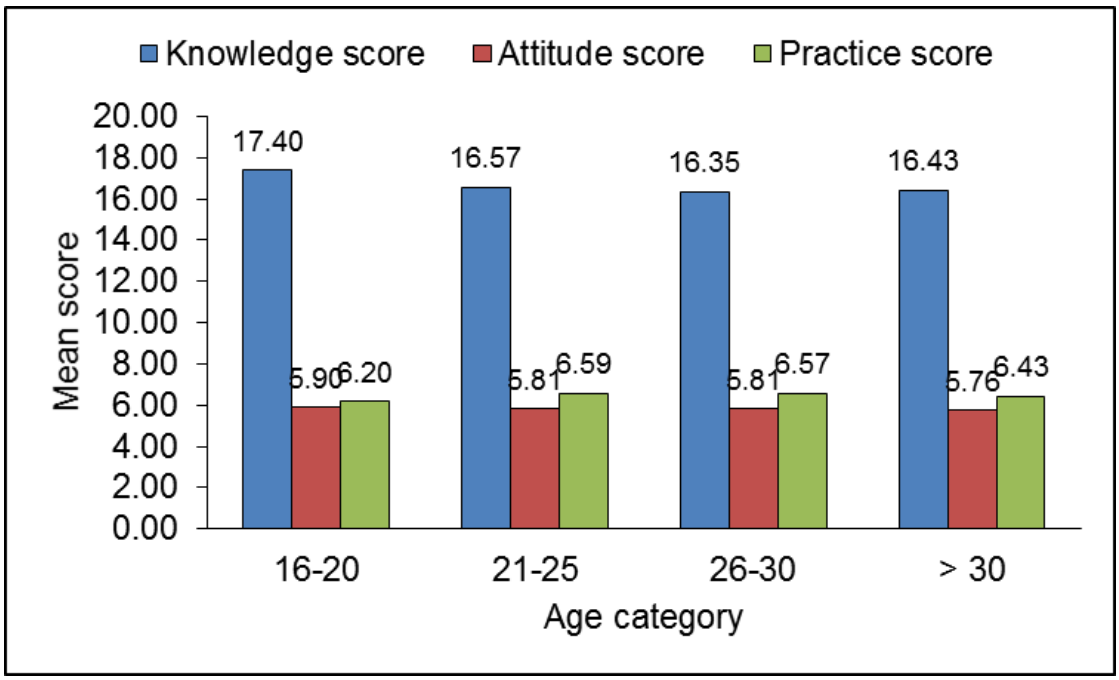
Graph 7: Column chart showing number of subjects according to attitude



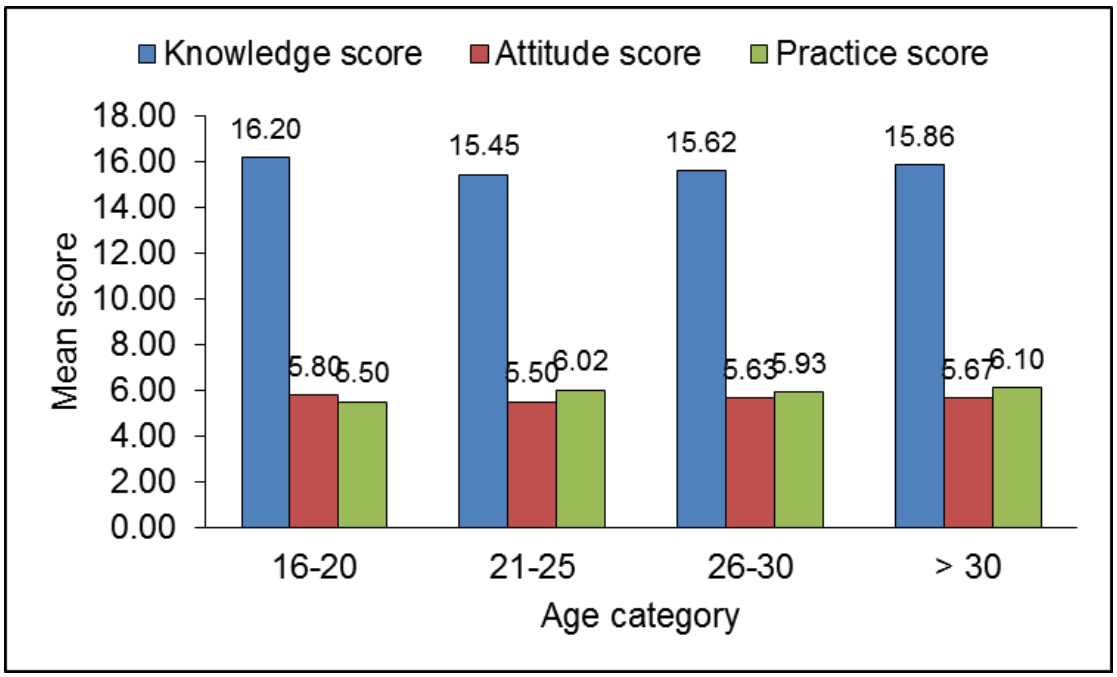
Graph 8: Column chart showing number of subjects according to practice



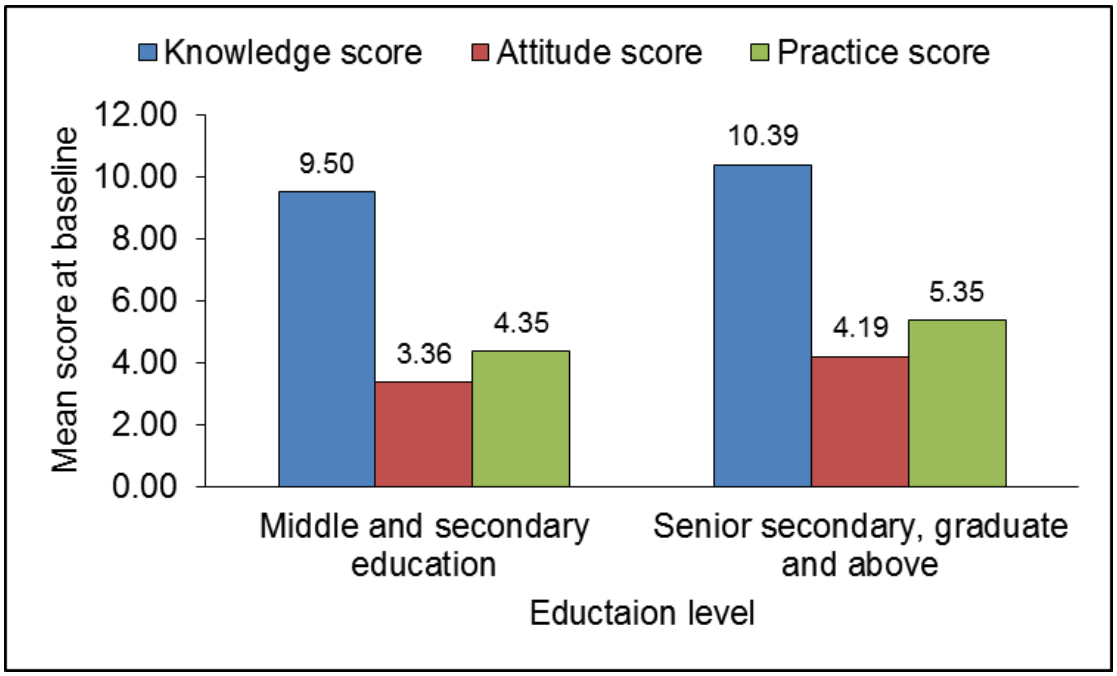
Graph 9: Column chart showing number of subject's knowledge, attitude and practice score according to age category (Baseline)



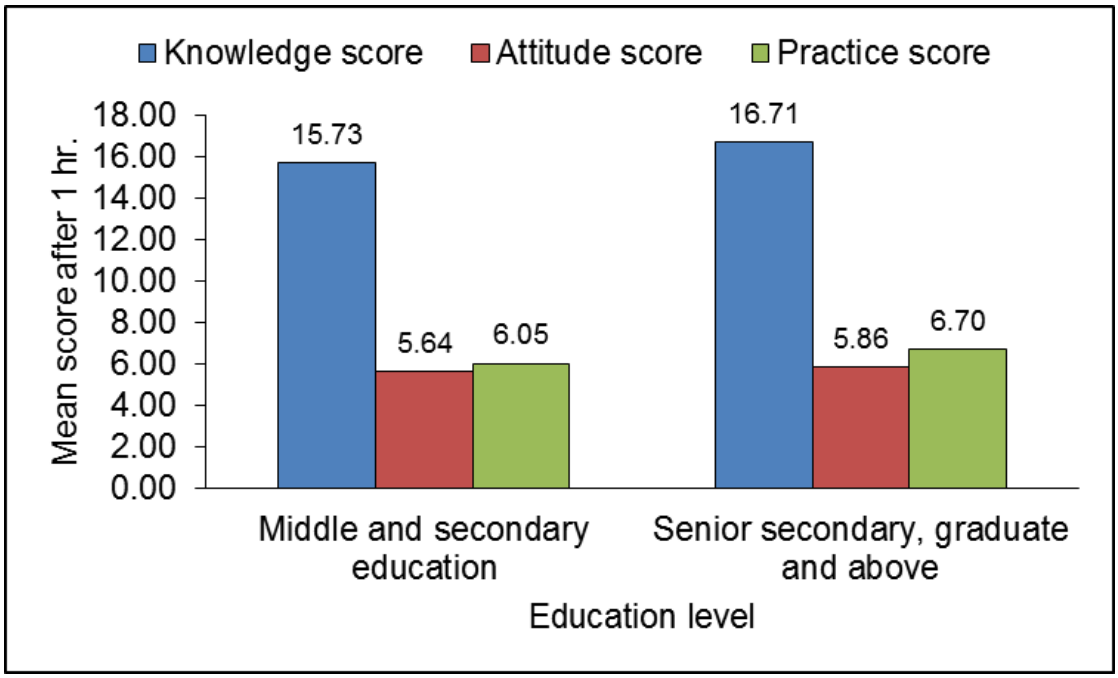
Graph 10: Column chart showing number of subject's knowledge, attitude and practice score according to age category (After 1 hr.)



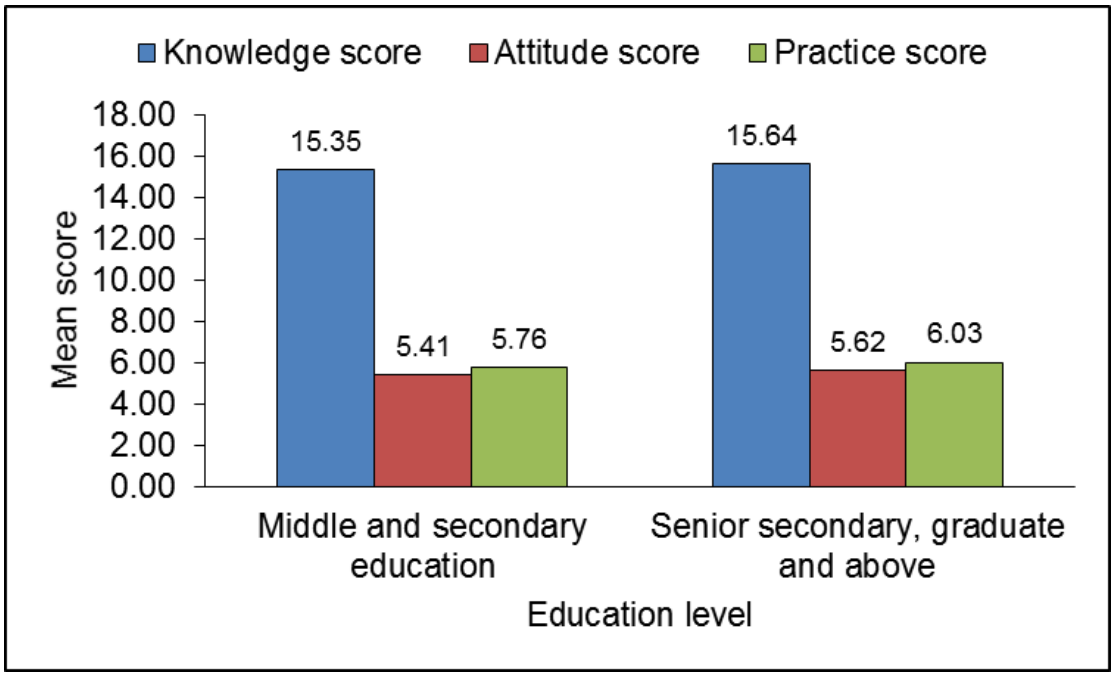
Graph 11: Column chart showing number of subject's knowledge, attitude and practice score according to age category (After 3 mo.)



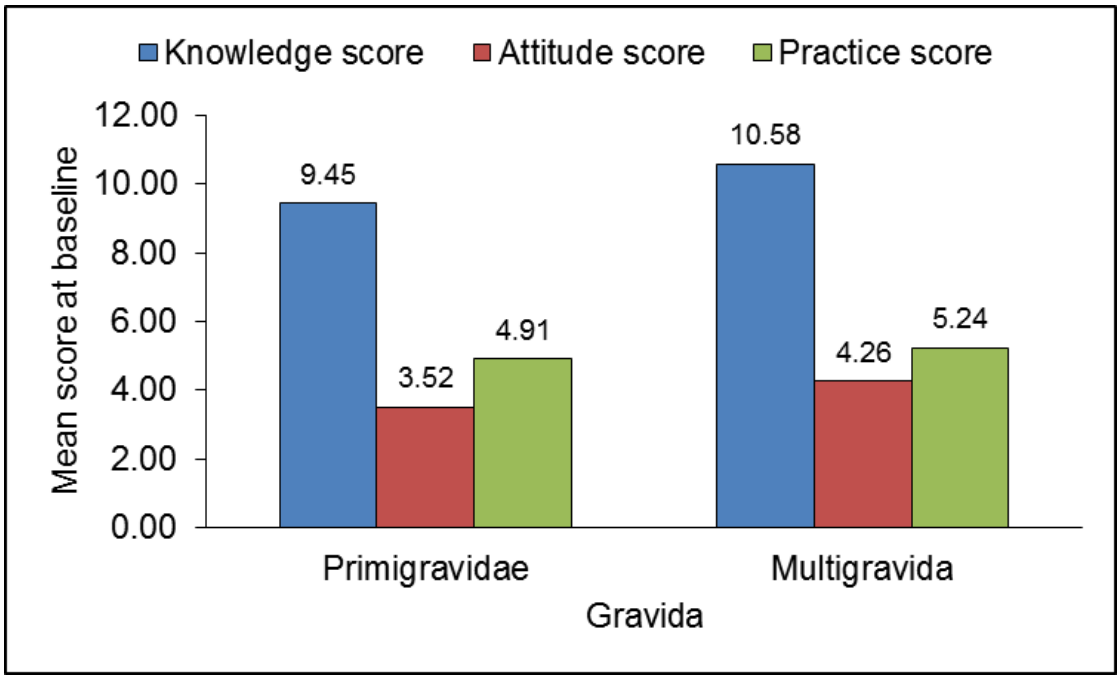
Graph 12: Column chart showing number of subject's knowledge, attitude and practice score according to education level (Baseline)



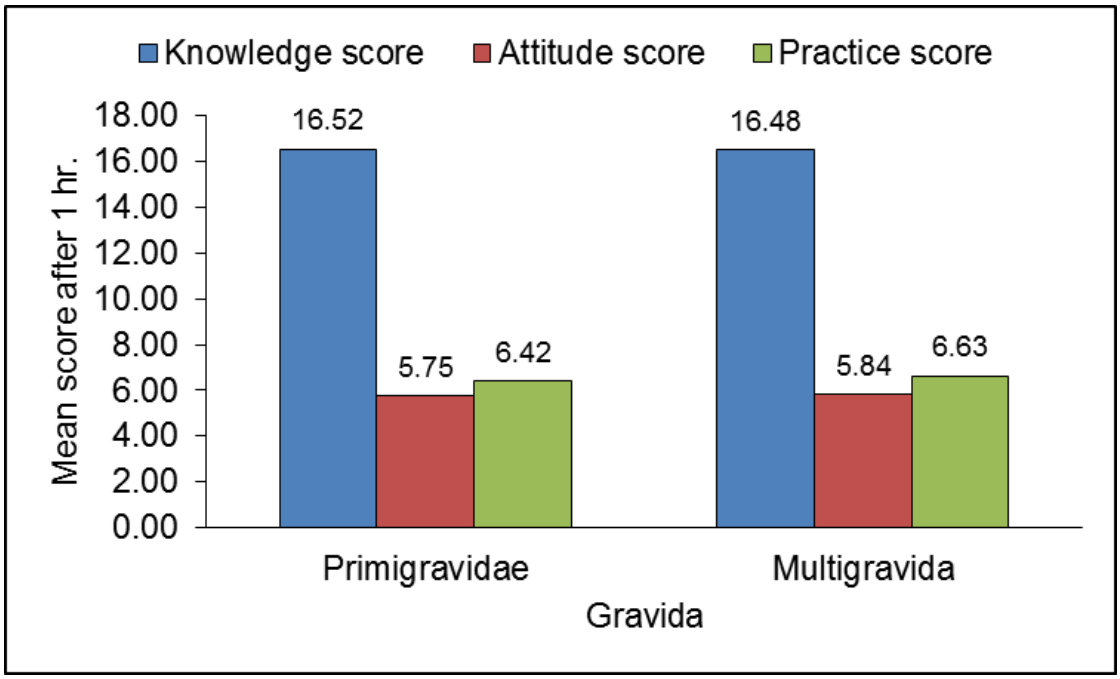
Graph 13: Column chart showing number of subject's knowledge, attitude and practice score according to education level (After 1 hr.)



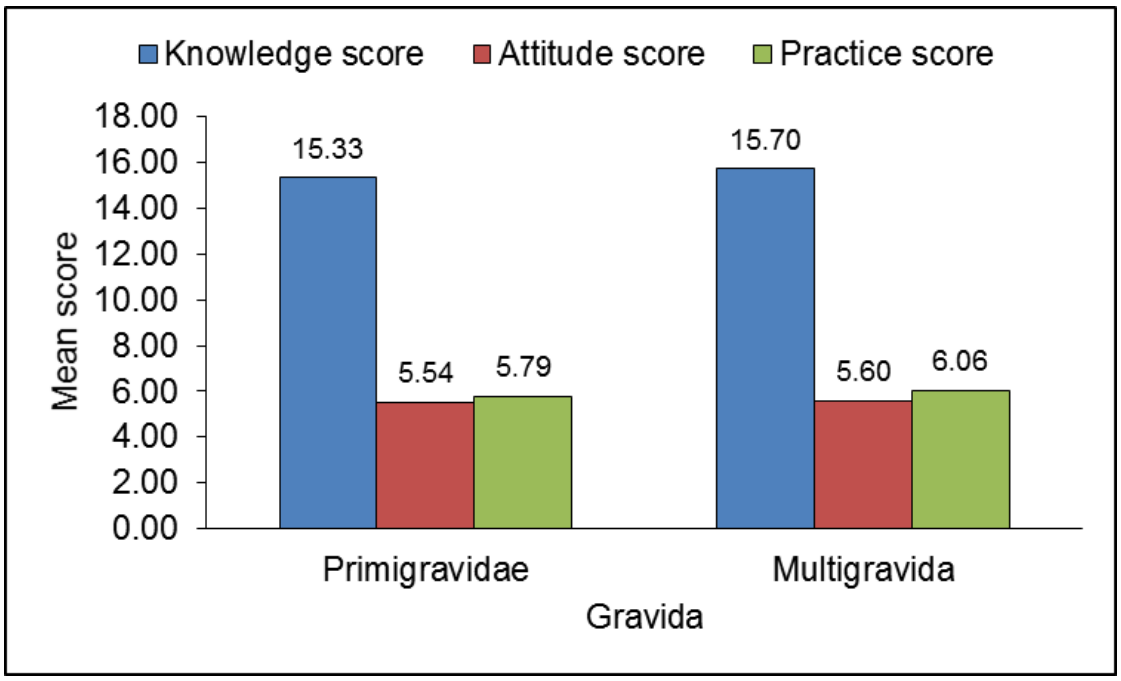
Graph 14: Column chart showing number of subject's knowledge, attitude and practice score according to education level (After 3 Mo.)



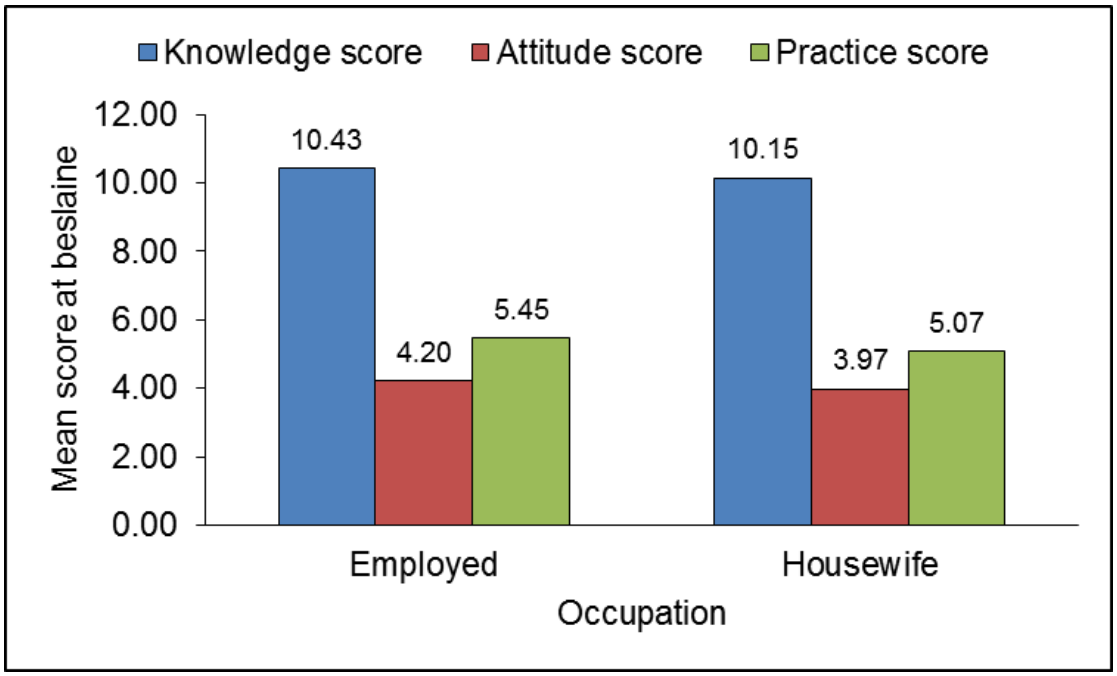
Graph 15: Column chart showing number of subject's knowledge, attitude and practice score according to no. of pregnancy (Baseline)



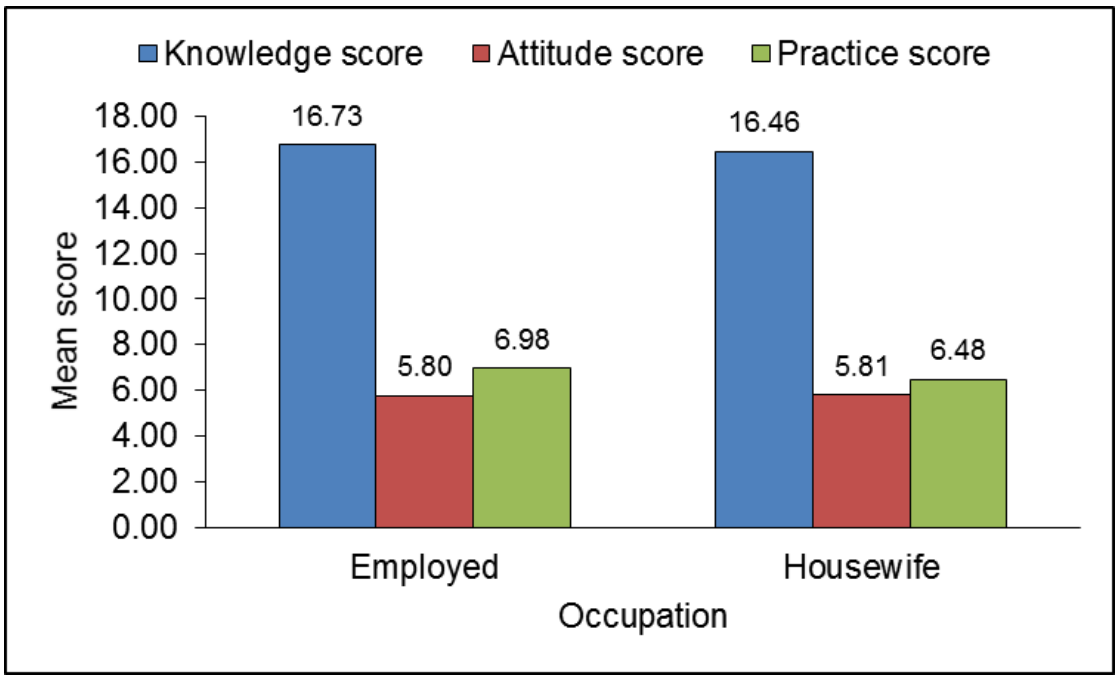
Graph 16: Column chart showing number of subject's knowledge, attitude and practice score according to no. of pregnancy (After 1 Hr.)



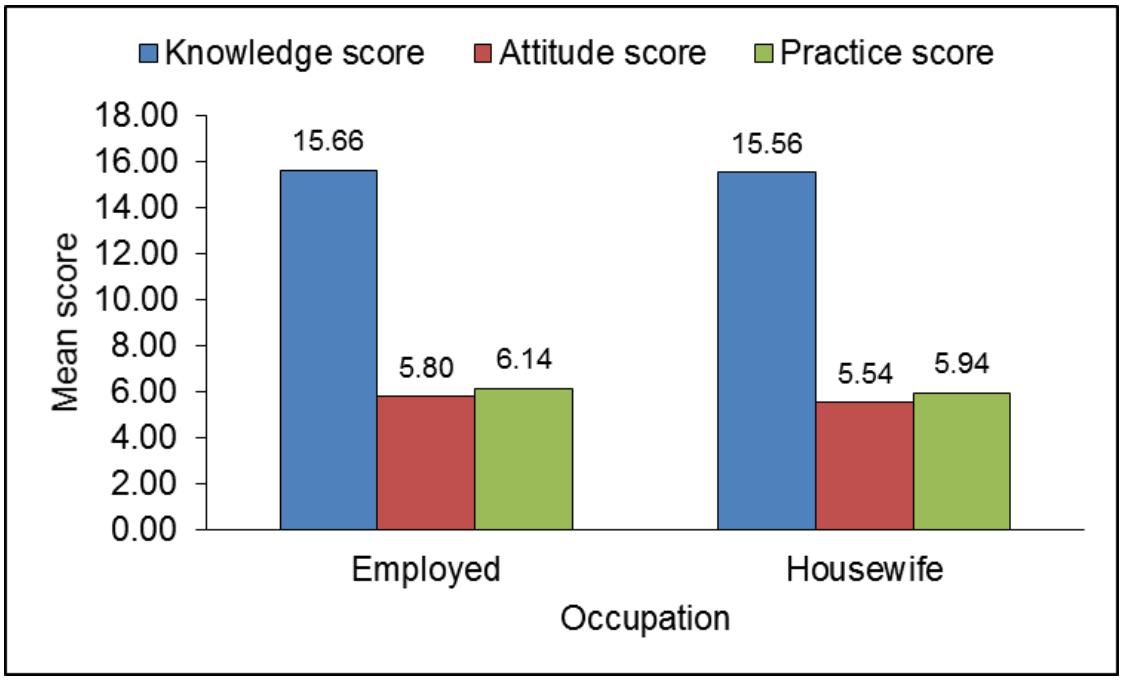
Graph 17: Column chart showing number of subject's knowledge, attitude and practice score according to no. of pregnancy (After 3 Mo.)



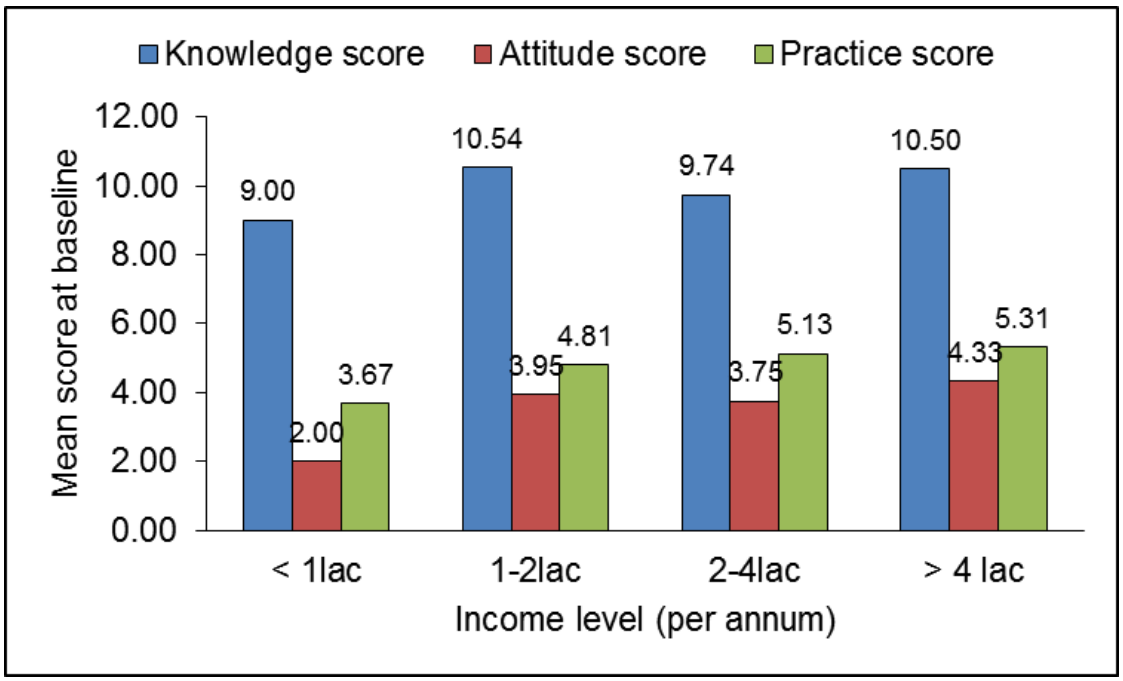
Graph 18: Column chart showing number of subject's knowledge, attitude and practice score according to occupation (Baseline)



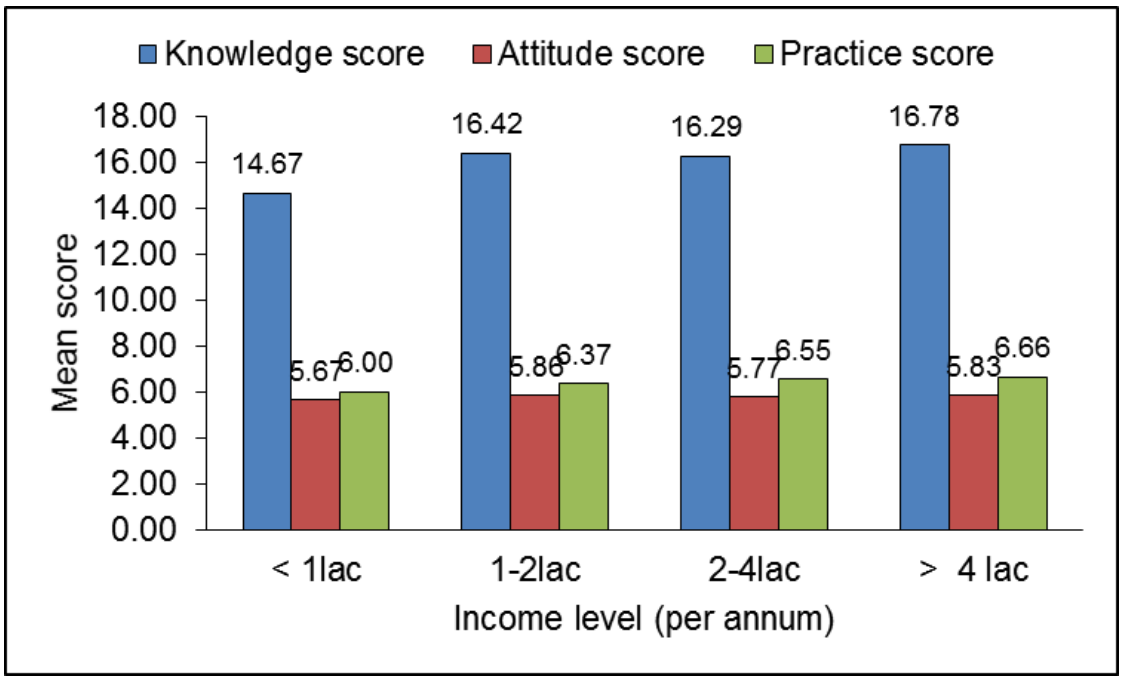
Graph 19: Column chart showing number of subject's knowledge, attitude and practice score according to occupation (After 1 Hr.)



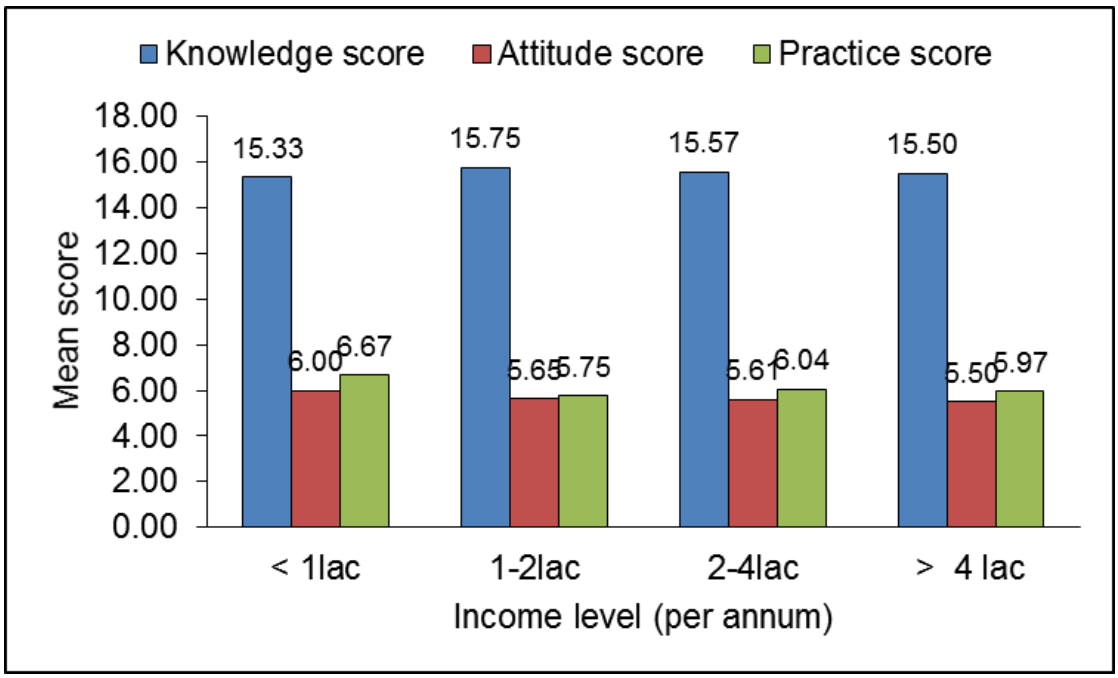
Graph 20: Column chart showing number of subject's knowledge, attitude and practice score according to occupation (After 3 Mo.)



Graph 21: Column chart showing number of subject's knowledge, attitude and practice score according to income level (Baseline)



Graph 22: Column chart showing number of subject's knowledge, attitude and practice score according to income level (After 1 Hr.)



Graph 23: Column chart showing number of subject's knowledge, attitude and practice score according to income level (After 3 Mo.)