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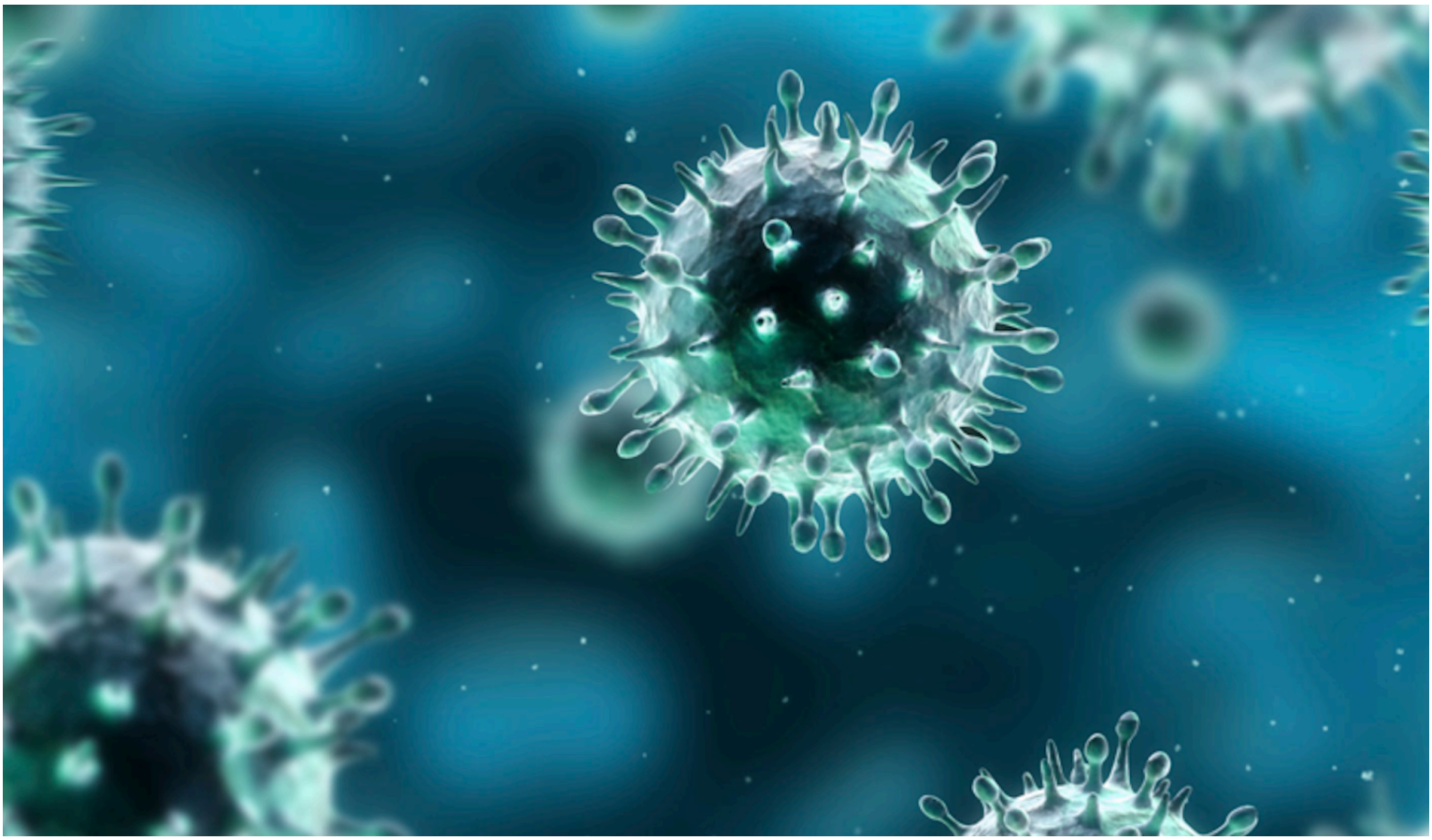

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A Situational Analysis of Home Delivery among Maasai Communities of Orkesumet, Northern Tanzania: The Qualitative Evidences

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Abstract
Background: Maternal mortality rates and Neonatal Mortality rates have remained to be unexpectedly high in sub-Saharan Africa. High magnitude of pregnancy and childbirth complications mainly due to home delivery. Identifying and solving barriers to facility delivery has remained to be a challenge. Methods: A descriptive cross sectional study to assess the cultural barriers impeding facility based delivery in the Maasai communities of Orkesumet ward of Simanjiro district, Northern Tanzania was conducted. Expert opinions from Maasai leaders, in-depth interviews, focused group discussion and observations were applied. Results: Expert opinions presented historical and current traditional practice in herbal medicine commonly used during child-birth in the remote Maasai Orkesumet ward. In-depth interview reported five main themes of "home delivery is safe", "Traditional medicine is better", "Giving birth is a blessing from God", "Bleeding can be controlled by traditional medicine" and "There is no hope from hospitals". FGD reported four main themes that "Female attendants are better", "Migration, transport cost and quality of care at health facility disturbs the continuum of care", "It is risky to be treated at the hospitals" and "Husbands are the key and mislead the communities". Observations provided evidences for herbal products that are commonly used. Conclusion: The Maasai present a strong trust and beliefs on their cultural, customs and traditional for home delivery while using innovative herbal medicine. They have negative attitudes towards a facility based delivery due to facility reported maternal deaths, quality of care for supplies and hygiene, distance and health care workers gender and attitudes.

Keywords: Child birth, Skilled Birth Attendance, Maasai Ethnic groups, Rural Health, Traditional Medicine, Maternal Health

Introduction

Maternal mortality rates and Neonatal Mortality rates are high in sub-Saharan Africa due to high prevalence of pregnancy and childbirth complications (WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division, 2015). The main attributes being chronic practice of home delivery diversified by socio-economic determinants (Doctor, Nkhana-Salimu, & Abdulsalam-Anibilowo, 2018). Interventions to reduce maternal complications and improve maternal and newborn survival including strengthening of political accountability exists (ten Hoope-Bender et al., 2016), but their utilization has been very low in most sub-Sahara African countries (Martin et al., 2016). Different cultural barriers that are inclined with non-skilled birth

attendants (World Health Organization, 2008) offer some limited explanations with limited evidences (Atuoye et al., 2017).

Tanzania is one of the sub-Sahara African countries that has a low utilization of skilled birth attendants which does vary by in-country regions and districts (Pfeiffer & Mwaipopo, 2013). The Maasai communities of Northeastern Tanzania have a low experience for skilled birth attendants (Magoma M., et al). They are Nilotic ethnic group of semi-nomadic people thought of as archetypical pastoralists with unique traditional birth practices (Stephens J, 2017). Due to their distinctive customs and beliefs, their traditional practices presents gender inequalities and cultural practices that do not present birth preparedness (Karanja et al., 2018), with an ultimatum undesired impact for facility based child birth.

The Maasai are culturally conservative people living in *Inkajijik* (Maasai word for a house), loaf-shaped houses made of mud, sticks, grass, cow dung and cow's urine of which a traditional health concerns influence a construct (Saitoti, 1990). Their core cultural lifestyle involves seasonal migration over large distances for pastures and water (Jennings C, Falola T, 2003) which disrupts the continuum of health services (Heaney AK, Winter SJ, 2016), particularly antenatal visits, facility delivery and postnatal visits (Lawson DW et al.,).

Women serve the families for food, housekeeping and child care at large. The Maasai women responsibilities pose a socioeconomic challenges to health access and have implications for the promotion of quality of maternal and newborn heath with effective facility delivery (Heaney AK, Winter SJ, 2016). A concern for the social determinant towards improving the proportion of child birth at health facility with skilled birth attendant (Reynolds J, 2011).

The Maasai women present a high preference for home birth delivery (Magoma M et al.,2010). Culturally, husbands typically serve as gatekeepers for women's attendance at health facilities for antenatal session's child birth and postnatal care. Repeatedly, husbands have been targeted to participate in different programs for facility delivery but majority of the Maasai community has not shown a desirable response (Ensor T, Cooper S, 2004). This means a lot has to be done to identify underlying factors influencing home based delivery and limited facility based delivery.

Repeatedly, the Maasai of remote communities have been known for their expertise in traditional medicine. They believe it is a sacred cultural heritage to sustain their health in all times (Ibrahim F, Barbara I, 1998). They use trees, *olchani*, (plural *ilkeek)*, as a source for medicine (Bussmann RW et al., 2006). Their seasonal pastoral practice for survival is dependent on the skills of herbal trees that are available in most of Northern Tanzania. On the other hand, the practice is bound with beliefs that affects the access for health services (Heaney AK, Winter SJ, 2016). Doubtfully, pregnant mothers and children appear to be the victims of the culturally bound traditional medicine practices (Vasan et al., 2014).

Little is known from the Maasai of Tanzania. We therefore conducted a cross sectional situational analysis aiming at assessing the cultural barriers towards facility child birth among the remote Maasai of *Orkesumet, Simanjiro, in Northern Tanzania*.

Methods

Study design, Settings and Duration.

A descriptive cross sectional study using a mix of qualitative approach was conducted in Langai division, *Orkesumet* ward, in Simanjiro District of Manyara region North-east Tanzania (see Figure 1). Study was conducted from 24th January to 29th January 2011, The National Bureau of Statistics of Tanzania reports the population of the *Orkesumet* ward to be around 5,325 people (National Bureau of Statistics, NBS, 2012).

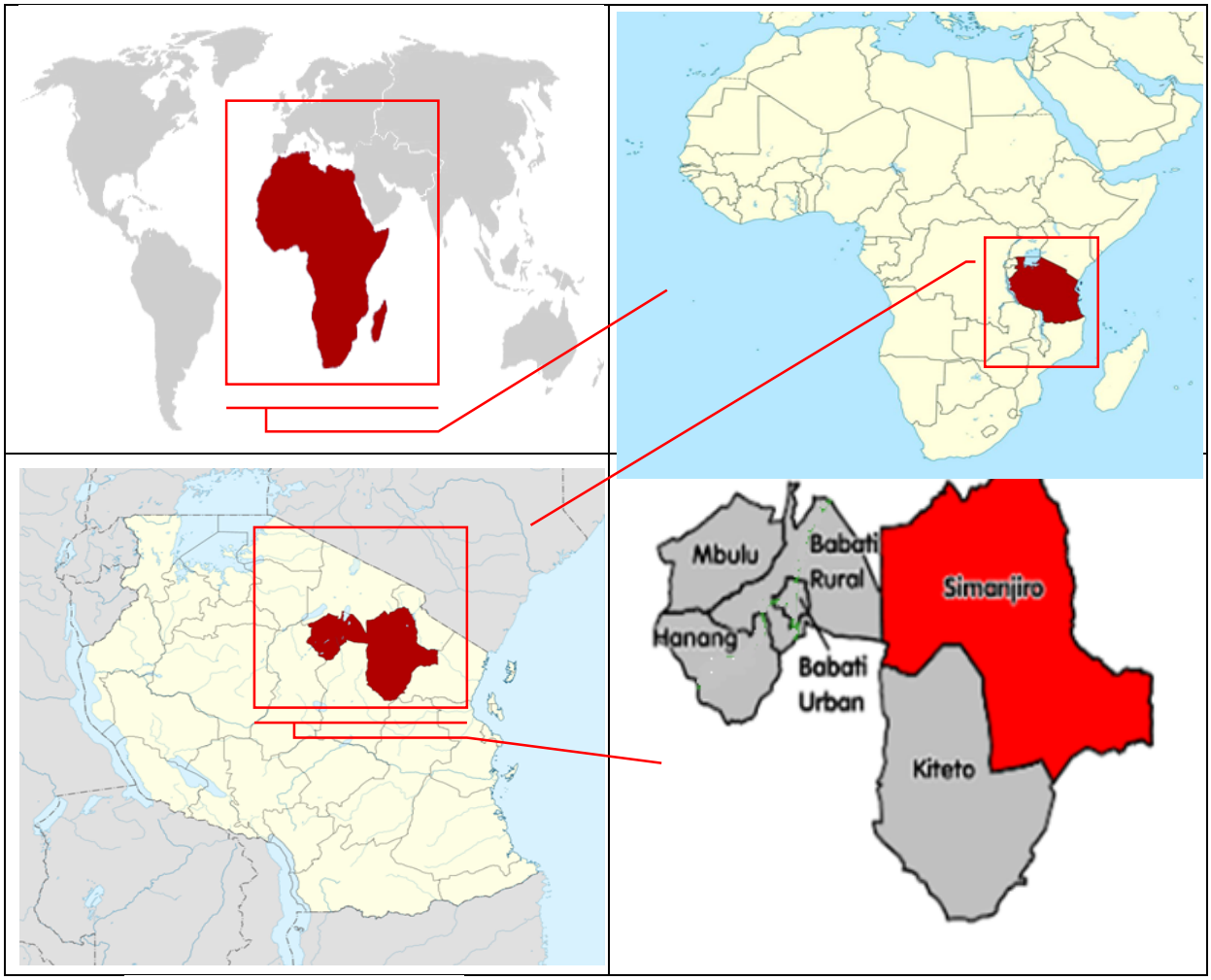

Figure 1. Location of Simanjiro District.

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Sampling

The ward leader (See Figure 2) volunteered to offer expert opinions and assisted the identification and the selection of most eligible women with a clear history of pregnancy complications. Purposively, mothers with more than 4 children and an experience of pregnancy complication were identified as eligible. A sample size of 24 mothers (three mothers from each of eight villages of Langai division that includes *Orkesumet* ward) were recruited. A quarter of the sample, 7 women were selected for Focused Group Discussion (FGD).

Figure 2. The Langai division leader in Orkesumet ward, Simanjiro District, Manyara, Tanzania. Consent Obtained. (©Vijiji-International, Langai ward in Simanjiro District. January 2011)

Data collection methods

Data were collected using expert opinions, in-depth interviews for mothers with high parity and experience of pregnancy complications, then focused group discussions (FGD) from a quarter of mothers with new striking information regarding choice of place of birth during in-depth interviews. Observations were done during the interviews using anthropological skills.

Data collection Techniques

The informants were asked on the number of children and their place of birth. Informants were asked to report a place of birth for all children. If they were giving birth at traditional birth attendants, they were asked what motivates them, what demotivates with reasons why and how. These initial questions aided further probing to allow the exploration of relevant themes during in-depth interviews. The use of FGD, followed the in-depth interviews where a quarter of mothers expressed their individual perceptions, arguments and during discussions regarding their options for the place of delivery, the challenges and support if any.

Data management and Data analysis

Data in a digital sound was stored in the data manager's server. Then all the discussions were narrated in word documents. Then the narratives were translated and then transcribed into different themes by color coding, then all codes were summarized in the excel sheet. Inductively and deductively thematically analyzed information were set into different layers. Each layer with main codes. Then codes were further coded and arranged into sub-codes in accordance with COREQ guidelines (Tong, Sainsbury, & Craig, 2007). A basic coding network was created, extended and altered with the emergence of further themes as analysis progressed. A final set of themes and sub-themes were created upon refinement and completion of analysis.

Ethics

The ethical approval was given by the Kilimanjaro Christian Medical University College – College Research Ethical Committee (CREC) on participant's rights and safety. The Manyara Regional Council Health Management Team (RHMT) and the Council Health Management Team (CHMT) of Simanjiro District gave permission to collect data limited to maternal, Newborn and Child health with a final feedback after a situational analysis.

Written informed consent written in Swahili was obtained from all participants and translated whenever required by a participant. All interviews were done in Maasai language after being translated by the Langai division lenders from the Swahili versions.

Results

A total of 24 mothers gave their experience throughout the in-depth interviews, 7 mothers discussed their experience with argument in focused group discussed, ward leader gave his expert opinion and observations were made anthropologically, without drawing a shocking attention.

From expert opinions

There were four main themes from expert opinion discussion.

Culture and Tradition is a way of life

The Maasai live with culture and beliefs in Maasai own culture a blessing and respect. Maasai believes in orders from elders and it is a norm and way to survive in with a pastoral life. The ward leader insisted that he attended secondary school but he is one of the cultural ambasadossor. He was well aware of herbal practice in *Orkesumet*. In his opinion he mention two out of three children were home delivery and he do not regret as it was clean and safe.

The of use herbal drugs for reproductive health is common and historical.

The ward leader explained: *"We have community healers, called the Laiboni, who are are deeply experienced in the medicinal plants from our surroundings as a heritage from generation to generation. They offer knowledge of olchani, plural ilkeek, (for medicine). The leaves, roots or bark can be used to treat a wide variety of diseases. For pregnant women they have a wide variety of herbal products used to control of women bleeding and inducing labor for pregnant women. Historically, the Laiboni are needed to do sacrifices and communicate to God Ngai (The almighty God) in a special vision and dreams".*

The knowledge is transgenerational.

He elaborated; "*The Ndorobo (hunter-gatherers) contributed a great deal in the discovery. We have other leaders called olaiguenani, chosen before circumcision who are used to lead the youths in peer groups until they attain old age they support cultural sexual and reproductive health issues".*

Community Key actors offer a guide for pace of child birth.

He explained *"The other leaders called Elders, they lead a clan with multiple Maasai defined roles, one of these being officiating and directing cultural ceremonies. They remind families about ethical approaches and making sensitive decisions on whether the husbands have a key role or otherwise the family can make a choice for a pregnant mother. The Elders also offer counseling and moral support on health matters and child health. They also update the clans on the availability of medical products and methods of application as guided by the Laiboni"*

From the in-depth interviews

There were five themes from in-depth interviews as follows;

Home delivery is safe.

Nineteen out of twenty four mothers reported that home delivery is safe as shown in the following narratives.

Mother ASL 35 years old, a mother of 7 said "*I think I don't have to be bothered by going to the health facility because we have well trained elders to offer a safe traditional delivery*".

Mother AKK, 33 years old, a mother 6 explained "*All of my children are delivered at elders, they are very skilled and offer service with a passionate care*" When asked if she ever tried hospital delivery she said "*The bed sheets are not clean in the hospital*".

Traditional medicine is better

Twenty one out of twenty four mothers reported that Traditional medicine is better as shown in the following narratives. MNK who was 28 years of age a mother of 2 children said "*I have never been to the hospital since when I was born, I have been taking Ormukutan herbs for abdominal pain, diarrhea, fever and headache. I think the Maasai medical drugs are very effective".* Mother AOL said *"Ohh… if you refuse herbal medicine you refuse life because all hospital drugs are from us"*

Giving birth is a blessing from God.

All twenty four mothers reported that Giving birth is a blessing from God as shown in the following narratives. Mother NTS, who was a mother of 11 children said; *"I feel happy to have eleven children and this is a good blessing from "Ngai" (God)".* "*I want two more children*". Mother MNK who was 28 years of age a mother of 2 children said "*Yes… (Laughed..!) …when… when… I will be forty years old I will have seven or eight more children. It is a blessing from God*"

Bleeding can be controlled by traditional medicine.

Thirteen mothers out of twenty four mothers said Bleeding can be controlled by traditional medicine as reflected by Mother NTS who explained; *"Bleeding is common and we have Maasai herbs to prevent bleeding as you know even my mother had 14 children and never lost blood during labor. We do believe that a mother can lose more blood at the hospital than with a support from traditional healer."* Mother ATT a mother of 5 elaborated "*Well it all depends on skills of the elder, the traditional birth attendant. The way you remove placenta matters a lot. Our elders are experts. When it fails they use herbal medicine and it never fails*". Mother MNK who was 28 years of age a mother of 2 children said "*I believe bleeding can be controlled only at the hospital because they can give blood when you have bled too much*"

There is no hope from hospitals.

Twenty one mothers out of twenty four mothers showed no hope with health facilities.

Mother SMN presented most of shocking complaint; "*We have heard a lot that women die in hospital and they bleed a lot. Their nurses have been telling us that hospital has a blood reserve but we are shocked that six times we sent mothers who have been bleeding excessively but they said they don't have any blood too give from their reserve*."

Mother AKK, 33 years old, a mother 6 complained "*The bed sheets are not clean in the hospital. No, No way every mother sleep in the same bed sheets. I have no hope."*

Themes from FGD members

There were four main themes from focused group discussion. These are; "*Female attendants are better", "It is risky to be treated at the hospital" and "Husbands are the key".*

Female attendants are better.

Majority of mothers presented confidence on traditional practice because female attendants are used. Mother PKS "*Yes, the presence of woman relative nearby to assist the elder creates more trust".* Mother AOT who is assistant Traditional birth attendant complained *"We don't understand why you have male doctors during child birth in the hospitals".* Mother JSS who had a history of stillbirths twice and has been assistant to traditional birth attendant complained elaborated *"We are happy that we are treated well with women elders. We have our free Ormumunyi used by women elders and it has a blessing from Ngai and our ancestors, why shall we walk for 60 Km to access hospital care?*" Mother DOO said" *I am free with women attendants. They are free to listen and we talk many things after child birth*". Mother STT argued "*I think male are more polite to pregnant women than women attendants to pregnant women*."

Transport cost is a problem

Mother NMO said "*we will go to antenatal clinic to check the status but we don't think that it will be necessary to deliver in the hospital. It is too far and sometimes we move to other areas to find grazing land. It is better to deliver at home"* When probed on the importance of traveling with RCH Card for attending a different facility, another mother, STT with 9 children said "*Yes, we heard a lot stories from nurses about family plaining and giving birth at the hospital but we have noticed more charges for travelling to hospital and disturbance with bad language at the hospital*"

Sub-theme: Migration is a barrier

Another mother VTO with 6 children explained *"Sometimes we have to move with our cattle and the distance becomes an issue*". A mother PKS aged 52 years old, a mother of four she elaborated further "*You know it is much safer at home wherever we go. Additionally, here is a lot of respect and privacy. An adult mother is serving an adult mother, but in hospital there is no respect. A young girl want to serve me for birth service!? Wait a minute, this is not possible. Are you guys serious*?"

Sub-theme: information given is not complete

Mother DOO complained "*I have noticed that repeatedly hospital workers were telling us the importance of agreeing with family planning. I have seen mothers in my village travelling long distance for family planning. I think it is good but I don't like that some of them have gave birth to only one child. Additionally, some of hospital workers said it will improve our family economy. I don't agree with them on money for household"*.

It is risky to be treated at the hospital

Mother JSS complained "*We have been visited many times by nurses from organization saying we need to refer women to hospital but 2 mothers who were bleeding died at hospital although we referred them. No we are not ready at all"*.

Mother AOT elaborated "*You know women comes to us for service. They trust us. They always want us to start serve them before referring to the hospital*"

Husbands are the key.

When asked about availability of husband support, Mother PKS explained "*Yes, my husband has been supportive but never trusted the facility based health care*."

Sub-theme: husband support traditions

There were six women in FGD supported PKS by saying "*yes, husbands involvement is important they are aware but they consider to be respectful to be attended traditionally*"

Mother NMO declined said "*No, I am surprised we have seen a lot of people discussing with men in village and they escort them to hospital services. In the past there were many occasions where men didn't follow up what is happening when a wife is giving birth"*.

Observational findings

The Langai leader stated that the use of herbal medicine was shared by the informants in *Orkesumet* ward. Some of the products extracted from the bark of trees called *Orbukoi* were widely used for treating febrile illnesses among pregnant women (Figure 3).

Figure 3. The used medicinal tree of Orbukoi for febrile illness. (©Vijiji-International, Langai ward in Simanjiro District. January 2011)

Another traditional product was the *Ormukutan* which is a well-known pain killer and wound remedy in the *Orkesumet* ward (Figure 4). *Ormukutan* has been commonly used as analgesic for both reproductive and non-reproductive complications. For controlling infections before child birth, the tea made from the bark of *Ormukutan* is used to treat multiple infections with fever and abdominal pain disturbing pregnant women.

Figure 4. The Ormukutan herbal medicine for relieving pain and treating infections during pregancy. (©Vijiji-International, Langai ward in Simanjiro District. January 2011)

The product called *Ormumunyi* tree is used to induce labor given when a woman begins to sense labour pain and sometimes assist the removal of the placenta after birth (Figure 5).

Figure 5. The Ormumunyi herbal medicine which used to induce labor. (©Vijiji-International, Langai ward in Simanjiro District. January 2011)

When a woman in labor pain would drink the juice from the *Ormumunyi* and will help to push during labor. The product of *Orkelelwet* is a famous abdominal pain remedy *Orkesumet* ward believe all types of abdominal pain after birth can be alleviated by *Orkelelwet* (Figure 6).

Figure 6. The bark of *Orkelelwet* medicinal tree is used to treat abdominal pain. (©Vijiji-International, Langai ward in Simanjiro District. January 2011)

The uses of *Oltepesi, the* herbs that are commonly used to treat sexual transmitted infections by boiling the small particles and apply them in the wounds around the genitalia (Figure 7).

Figure 7. Oltepesi the herbs that is commonly used to treat infected wounds and sexual transmitted diseases with wounds at the genitalia at *Orkesumet* ward (©Vijiji-International, Langai ward in Simanjiro District. January 2011)

Discussions

Repeatedly, the lifestyle that the Masaai have involved innovative cultural health practices that have been shown to enable survival in scrublands (Ibrahim F, Barbara I, 1998). The expert opinion from ward leader reflected a pride to their culture that is not shaken by western influences. They present a rigid cultural practice that is resistant to foreign concepts of development like agriculture (Jennifer Hatfield, 2012) has affects food security (Galvin KA, Beeton TA, Boone RB, BurnSilver SB, 2015), (Forstater M, 2002). They also present food restrictions that pose malnutrition (Lawson DW et al, 2014) with ultimate unintended undesired impact on maternal and newborn health (Chege PM, Kimiywe JO, Ndungu ZW, 2015). Their seasonal migration (McCabe JT, Smith NM, Leslie PW, Telligman AL, 2014) for pastoral water and grazing land (Amin M,

Willetts D, Eames J, 1987) contributes to unstable regular hospital visits especially the antenatal visits and postnatal care.

The social life is built in discipline to the community leaders, *Laiboni*, *Olaiguenani*, as the main actors for herbal practice and traditional medicine. It is through *Laiboni* and *Olaiguenani*, educational heritage of using plants *olchani*, (plural *ilkeek)* to heal (Bussmann RW et al, 2006) is inherited from one generation to generation. The elders, choose the families to treatment and promote the culture (Thikra Sharif, 2015). They present a social role to disease controls, support social accountability (Bussmann RW et al., 2006) and safe reproductive health practices (Liu J., 2012). A study in Ngorongoro, Tanzania (Lennox, Petrucka, & Bassendowski, 2017) described them as a potential community actors (Terry PE, 2018) necessary for effective health promotion in Maasai communities (Roggeveen Y et al., 2016).

The Maasai knowledge, attitudes and practice towards a culture present a number of qualitative evidence to support home delivery (Rollinger JM, Langer T, Stuppner H, 2006) and oppose facility based practice (Magoma M, Requejo J, Campbell OM, Cousens S, Filippi V, 2010). In the in-depth interview, we found 5 main themes which are "*Home delivery is safe", "Traditional medicine is better", "Bleeding can be controlled by traditional medicine", "Giving birth is a blessing from God",* and *"There is no hope from hospitals"*. These attitudes and practice evidences might be perpetuated by structural and process quality challenges in the hospital facilities as similarly reported in rural Zambia (Sialubanje, Massar, Hamer, & Ruiter, 2015).

The theme *"Giving birth is a blessing from God"* has a faith attribute but pose a challenge for family planning and as well institutional delivery. This finding is sensitive, it has to be addressed carefully as described by Srikanthan and Reid (Srikanthan & Reid, 2008) and Adewuyi in 2017 (Adewuyi, Zhao, Auta, & R, 2017).

From our FGDs, we found four main themes namely: "*Female attendants are better", "Transport cost is a problem"*, *"It is risky to be treated at the hospital" and "Husbands are the key"*. All themes present worries in the hospital practice despite availability of skilled birth delivery. The FGD theme *"It is risky to be treated at the hospital"* gave more insight for quality challenges in the hospital facilities. Other mothers different from those documented in the in-depth interview narratives gave similar messages elaborating "*Home delivery is safe", "Traditional medicine is better", "There is no hope from hospitals"* themes in same way as it was reported by the Maasai communities of Kenya (Karanja et al., 2018) that prestige of TBAs in community, community trust, and confidence in TBAs is the issue (Caulfield et al., 2016). We believe that these women's experiences and beliefs can offer a starting points for the design of quality maternal and newborn health interventions as described by Sialubanje and colleagues in 2015 (Cephas Sialubanje et al., 2015).

There were three new themes from FGD, these are; "*Female attendants are better", "Transport cost is a problem"*, *and "Husbands are the key"*. Although the themes supported their traditional practice they provided learning areas for improving facility based skill birth attendance. For example, the informants showed their worried for men attendants but others demanded more trained male attendants. They presented a need for effective counseling of distance by birth preparedness and the importance of husbands for supporting facility birth attendance. The same finding was reported in Sierra Leone in 2014/2015 where staff attitudes, undefined fear. Logistic issues, transportation problems were the main barriers to facility based delivery (Theuring, Koroma, & Harms, 2018).

In our observation methods, we found evidences of traditional herbal products with a pictorial evidences. These findings echo another study in Kilimanjaro region showing wider application of the herbal discoveries (Stanifer et al., 2015) that contains effective antimicrobial agents (Ibrahim F, Barbara I, 1998). In our case we have demonstrated the practical use of few herbal items (Bussmann RW, Gilbreath GG, Solio J, Lutura M, Lutuluo R, Kunguru K, Wood N, Mathenge SG, 2006) for home delivery and bleeding control. The use of these products is supported by cultural norms and other practices conducted with respect. The Maasai of *Orkesumet*, do not have statistical evidences on outcomes of care from home delivery versus facility delivery. They are not aware that most referred women and those who dies at the facility presented as referral cases with complicated pregnancies. Physically they see what they believe and they practice traditional during and after pregnancy (Roulette CJ et al., 2018).

The traditional practice among the Maasai of Tanzania present a potential pharmacological and biomedical discovery in the near future. Their customs and beliefs shall not be criticized but further respected and integrated thorough their community actors. The community based health promotion for Basic Emergency Obstetrics and Newborn Care, BEmONC (Pasha et al., 2010), can be further deigned using the traditional barriers to enhance facility delivery.

We have learned that the amount of information given to the community regarding quality BEmONC is doubtfully not sufficient. The ongoing Socio-Behaviour Change Communications (SBCC) (Mosdøl A, Lidal IB, Straumann GH, Vist GE, 2017) must use traditional actors (Kumbani L, Bjune G, Chirwa E, Malata A, Odland JØ, 2013) while evaluating relevance, evidence, intervention, ethnicity comments, and trends (Davidson EM et l., 2013).

Limitations

This research was a situational analysis conducted on student and health care workers from Kilimanjaro Christian Medical University College under voluntary action work. Time and funding was limited for time quantitative data using relatively large sample size. The investigators wanted to have an insight for qualitative reasons and determinants affecting the facility base child birth.

Conclusion

The construct of culture, traditional medicine and customs for home delivery carries a practical evidence with better outcome of care for years. There is a strong belief in their traditions and negative attitude for facility based delivery due to facility based maternal deaths, quality of care for supplies and hygiene, distance and health care workers gender and attitudes.

Authors' contributions

BM developed a concern and mobilized students and volunteers OPK, SJL, MAZ, JRA, PLS, EGK and ZMR to collect data through UKM. BM, UKM, LK, OPK, SJL, MAZ, JRA, PLS, EGK and ZMR and AK performed the analysis. LK and AK performed interpretations, BM, UKM AK LK, and GJ participated writing of the initial manuscript. All authors approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

Availability of data

The data is available at Kilimanjaro Clinical Research Institute and the Vijiji International Moshi office.

Consent for publication

Applicable.

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SNR Value Evaluation of Knee MRI 1.5 T Using Volume and Surface Coil in Fatmawati General Hospital Jakarta

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Abstract
Introduction: Signal to noise ratio (SNR) is one of the determining factors of MRI images quality. SNR is defined as the ratio of the intensity of an object signal seen with noise. There are several factors that can affect SNR, one of them is the radiofrequency coil. Knee MRI examination based on the literature using a Knee coil with the shape of the volume. While in some hospitals the use of coil when the MRI knee examination can also use the surface coil. This is because the hospital does not have the coil volume or the condition of the patient's knee that it is not possible to use volume coil. Objective : To evaluate SNR on MRI Knee examination using volume coil and surface coil with 1.5T Magnetom Esenzza MRI Scanners at Fatmawati Hospital. Method: The type of this research is quantitative analytics with experimental method, which was conducted in Radiology installation of Magnetic Resonance Imaging (MRI) atFatmawati General Hospital Jakarta starting from March to April 2018, with 16 samples. The technique of data collecting is done by observation and experiment. Research instrument consists of the worksheet, operator console, and counting sheet. Processing and data analysis is done by using paired sample T-test statistic. Results: The result of this study indicates that there is a difference of image quality in SNR aspect on the image of MRI knee inspection using volume coil and surface coil marked with p-value <0.05. Conclusion: MRI Knee examination using volume coilpossess higher SNR than using the surface coil. But, the surface coil can be the second choice for MRI Knee examination if the hospital doesn't have volume coil or surface coil, it can't be used for the patient.

Keywords: MRI Knee, SNR, Volume Coil, and Surface Coil

1. Introduction

The principle of MRI was discovered in 1970 by Nobel Laureates, Paul Lauterbur and Peter Mansfield(1). Broadly speaking, MRI occurs because of a patient which is placed in a field that has high magnetic strength and will be temporarily magnetized. Resonance will be generated through the application of certain pulses and then absorbed by the patient. After that, excess energy is released and calculated. The signal is captured and processed by the computer and converted into a grayscale MRI (2,3).

The ability to represent a multiplanar plane, removing bone artifacts and increasing the contrast resolution of soft tissue is an advantage of MRI in the case of the musculoskeletal system compared to Computed Tomography (CT). The musculoskeletal system has become a very controlled area by MRI (4–6). So that MRI is very useful for diagnosing tearing of the cruciate and collateral ligaments and osteonecrosis in the femoris condylus (7,8).

The quality of MRI images is controlled by many factors, in this case, such as selecting the right parameters in the chosen protocol. It is very important for the operator to know these factors and how they are related so that optimal image quality can be produced. There are 4 important factors in determining image quality, namely signal to noise ratio (SNR), contrast to noise ratio (CNR), spatial resolution and scan time (9).

Signal to noise ratio (SNR) is defined as the ratio of the signal intensity of the object seen with noise (9–11). In MRI imagery, SNR can be assessed subjectively and objectively. Objective assessment was carried out using mathematical calculations of signal intensity and noise from the images assessed, in this case the anatomy often assessed in knee MRI examinations such as the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), articular cartilage of the femur, femur, patella, and tibia (12,13).

Signal intensity on knee anatomy and surrounding organs is known by carrying out ROI (region of interest) (11), ROI is a measurement technique by activating the ruller menu on the MRI computer console to determine the average signal intensity of the organs examined. When performing ROI, the monitor will also display the noise (standard deviation) value of the image, this signal intensity and noise value will be used to calculate the SNR. The higher the SNR value, the better the image quality (9).

There are several factors that can affect SNR, such as magnetic field strength, proton density of organs examined, voxel volume, time repetition (TR), time echo (TE), number of average, number of acquisition (NSA), radiofrequency coil, etc. (9,11,14). Radiofrequency (RF) coil is a hardware instrument that functions to receive signals (9).

As long as researchers carry out practical field training in hospitals, the use of coil when examining knee, MRI is not only using volume coil such as knee coil but also using surface coils such as body coil and flex coil. One of them is at Fatmawati Central Hospital.

A Knee MRI examination using a surface coil on a 1.5 T plane was carried out by D. Lawrence Burk, Emanuel Kanal, James A.Brunberg, et al. in the journal "1.5 T Surface-Coil MRI of the Knee". The conclusion of the experiment is that Knee MRI examination using surface coil can improve SNR and show meniscus, synovial fluid, ligament, etc. well (7). However, in the experiment, the SNR value was not calculated from the results of the description and did not display a comparison with the use of coil volume so that the difference is unknown.

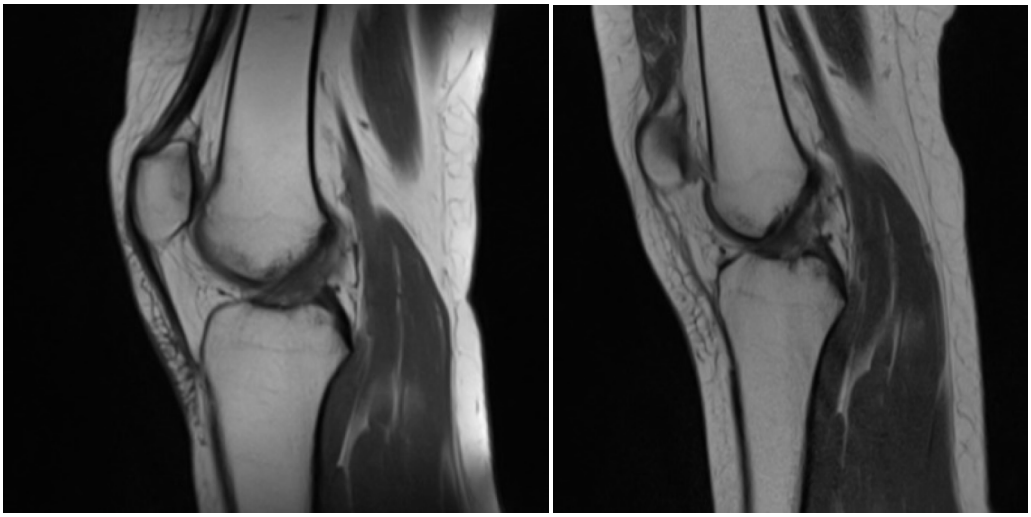
This causes researcher’s interest in taking the title "Evaluation of SNR value on Knee MRI examination using coil volume and surface coil with MRI 1.5 Tesla machine in Fatmawati General Hospital" in order to assess whether there are SNR differences between the two coils and evaluate which coil is capable of displaying knee MRI image with better SNR category, in order to produce an optimal image.

2. Methods

The type of research used is quantitative analytic. The method of observation and experimentation was done in the Radiology Installation of Fatmawati General Hospital in February to April 2018. The population was all patients who came to undergo a knee MRI examination in Radiology Installation in Fatmawati General Hospital with a total sample of 16 patients. The research instruments are worksheets, operator MRI consoles, and measurement sheets. The method of data collection is performed by experimental techniques, and the researcher performs an MRI examination of the fragments of the PD sagittal sequence using the volume coil and surface coil that SNR will be assessed objectively. Test the hypothesis using the Dependent Paired Sample T-test. The MRI scanner that used is 1.5 Tesla, volume coil (Knee coil), surface coil (flex coil), emergency bell, headphone, and operator console.

3. Results

The results either the Knee MRI images are sagital slice with Proton Density TSE Sequence using volume coil and surface coil as shown in Figure 1.



(A) (B)

Figure 1. Sagital Image **of** Knee MRI using : **(A)** *Volume Coil* **(B)***Surface Coil*

Table 1. Recapitulation of anatomical SNR values of the sagittal slice with Proton Density TSE Sequence with the volume coil

Sample	**SNR values of the knee anatomy using volume coil**						Total	Mean
	ACL	PCL	ACoF	Femur	Patella	Tibia		
1	17.84	23.41	34.34	126.10	115.78	97.35	414.83	69.14
2	26.78	8.79	42.47	146.24	123.73	115.62	463.62	77.27
3	39.23	7.81	41.72	95.86	94.10	72.21	350.92	58.49
4	39.27	26.68	60.22	145.00	137.74	133.86	542.78	90.46
5	38.28	22.19	55.32	163.80	155.98	144.15	579.74	96.62
6	20.36	14.41	36.64	87.78	88.10	71.35	318.64	53.11
7	14.75	18.67	35.61	76.40	81.34	69.16	295.94	49.32
8	57.29	21.19	92.30	240.15	248.17	106.26	765.37	127.56
9	70.06	33.09	55.93	117.15	112.45	32.21	420.88	70.15
10	47.22	16.61	56.91	172.08	150.36	157.68	600.86	100.14
11	25.55	6.63	40.84	137.91	120.21	137.46	468.60	78.10
12	45.37	7.93	77.70	210.04	195.96	133.96	670.96	111.83
13	21.80	20.09	42.96	126.51	131.88	85.92	429.17	71.53
14	24.11	22.40	32.66	108.03	86.66	85.90	359.76	59.96
15	27.86	21.93	55.98	141.47	137.09	105.36	489.70	81.62
16	20.19	12.57	39.00	119.65	119.54	99.50	410.46	68.41
Average	33.50	17.78	50.04	138.39	131.19	103.00	473.89	**78.98**

Table 1 is a recapitulation of the anatomical SNR values of sagittal slice with Proton Density TSE Sequence using the ROI technique. The objective calculation result (ROI technique) of anatomical SNR values of sagittal slice with Proton Density TSE Sequence using volume coil is 78.98.

Table 2. Recapitulation of anatomical SNR values of sagittal slice with Proton Density TSE Sequence with surface coil

Sample	**SNR values of the knee anatomy using Surface Coil**						Total	Mean
	ACL	PCL	ACoF	Femur	Patella	Tibia		
1	12.63	13.71	25.06	111.04	103.37	89.55	355.36	59.23
2	16.54	8.05	24.26	114.44	100.48	90.03	353.81	58.97
3	19.66	12.76	27.23	68.05	73.40	57.80	258.91	43.15
4	63.19	24.56	57.75	155.04	168.18	126.39	595.11	99.18
5	32.08	16.39	42.33	132.43	118.24	109.93	451.41	75.23
6	20.19	17.35	46.57	110.04	114.01	97.44	405.60	67.60
7	23.06	18.88	44.56	95.23	108.04	70.39	360.17	60.03
8	34.69	13.83	56.39	172.16	142.59	121.66	541.31	90.22
9	22.89	15.31	42.76	84.49	86.74	72.51	324.69	54.12
10	18.23	13.07	30.71	109.05	98.59	92.19	361.83	60.31
11	15.72	9.81	32.52	98.85	91.93	85.00	333.82	55.64
12	27.22	11.53	32.61	145.91	109.29	86.06	412.61	68.77
13	18.92	20.74	53.05	126.64	121.22	107.60	448.17	74.70
14	29.45	26.10	40.15	139.95	138.43	110.95	485.04	80.84
15	21.61	15.43	38.38	110.42	108.76	93.53	388.13	64.69
16	7.65	14.12	45.62	110.18	108.17	89.27	375.02	62.50
Average	23.98	15.73	40.00	117.74	111.97	93.77	403.19	**67.20**

Table 2 is a recapitulation of the anatomical SNR values of sagittal pieces using the ROI technique. The objective calculation results (ROI technique) of anatomical SNR values of sagittal slice with Proton Density TSE Sequence using surface coil is 67.20.

Table 3. Normality test SNR values of the knee anatomy using volume coil and surface coil

Coil	Shapiro-Wilk		
	Statistic	Df	Sig.
Volume Coil	0.948	16	0.452
Surface Coil	0.946	16	0.430

Table 3 explains that the significant test results of mean of anatomical SNR values of sagittal slice with Proton Density TSE Sequence with volume coil possess p-value (sig) = 0.452 (p> 0.05) and use surface coil p-value =

0.43 (p> 0.05) then normal data distribution. Because the data is normally distributed, the data is tested using the Paired-Samples T-Test.

Table 4. Paired Sample T-Test SNR values of the knee anatomy using volume coil and surface coil

		Mean	*Std Dev.*	*Std Error*	*95% Confidence Interval of the Difference*		*t*	*df*	*Sig. (2–tailed)*
					Lower	*Upper*			
Pair	Volume Coil Surface Coil	*11.78*	*19.44*	4.86	1.42	22.14	2.42	15	.03

In table 4, the Sig. (2-tailed) Shows the value of hypothesis decision, after analysis using statistical calculation software, with paired samples T-test results obtained p-value = 0.03 (p <0.05), so Ho is rejected. That is, there is a difference in the quantity of images in the aspect of SNR values of the knee anatomy between those that use volume coil and surface coil.

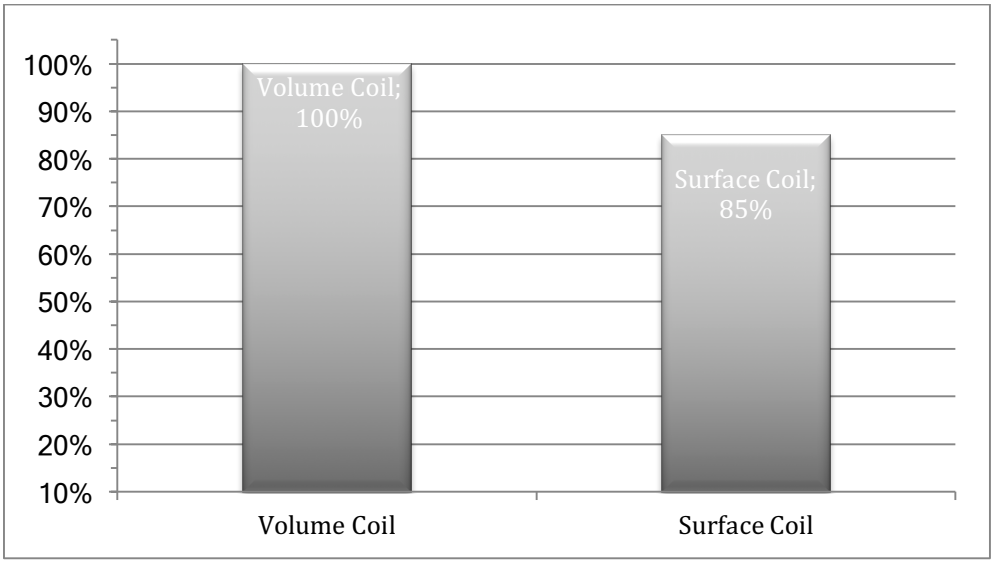


Figure 2 Percentage of SNR values of the knee anatomy using volume coil and surface coil (SNR values of the knee anatomy using volume coil as reference, 78.98 = 100%).

On Figure 2 by making SNR values of the knee anatomy using volume coil as the optimal SNR value on knee MRI examination (78.98 = 100%), the percentage SNR values of the knee anatomy was obtained using surface coil (67.20 = 85%). So that the percentage difference between SNR values of the knee anatomy using volume coil and surface coil is 15%. Based on the results of research on 16 samples regarding the evaluation of SNR values of the knee MRI examinations using coil volume and surface coil with MRI scanner 1.5 Tesla in Fatmawati General Hospital, the following discussion was found:

4. Discussion

a. Signal to Noise Ratio

The calculation results of SNR values of MRI examination on knee anatomy such as anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), articular cartilage of femur, patella, femur, and tibia using volume coil and surface coil in 16 samples can be seen from paired analysis T test samples obtained a significance value / p-value = 0.028, thus the p-value <p = 0.05. So it can be concluded that Ho is rejected, that is, there are differences in image quality in the SNR aspect on the results of the MRI knee examination image using different coils (volume coil and surface coil).

This is in accordance with the theory, one of which is in the book "MRI in Practice: by Catherine Wetsbrook mentioning one that affects SNR is the radiofrequency coil. RF coil function is to generate and provide RF and detect signals. Coil transmitters are useful for emitting radio waves at a localized nucleus so that an excitation phase occurs. While the receiving coil is useful for receiving output signals from the system after the excitation phase occurs (15). The selection of the right coil type will have an effect on producing a maximum SNR value. SNR is one of the determinants of the quality of MRI images, SNR is the factor that most determines the quality of MRI images (9,11,14). In research with objective calculation of SNR values as can be seen in table 4.5, knee SNR values using coil volume are in the range 49.31-127.56 with an average value of 78.98, while the SNR value of the MRI knee uses surface coil in table 4.6 in the range 43.15-99.18 with an average value of 67.2, from the results of these calculations it is known that the average value of knee SNR uses a higher coil volume than the average value of the knee anatomy SNR using surface coil. With knee SNR anatomical value using coil volume as a reference, 78.98 (100%), then obtained knee SNR value using surface coil 67.2 (85%), then the difference between SNR values of the knee anatomy uses volume coil with surface coil is only around 15%.

b. Advantages and disadvantages of volume and surface coil

The strength of the knee coil is its design in the form of a volume and in accordance with the knee form so that it can provide a homogeneous image in the anterior and posterior regions, as described by Blink, (16). Because the shape is in the form of volume and according to the shape of the knee making it easier for the MRI operator to adjust the position of the knee. In terms of image quality by looking at SNR, SNR volume coil is higher than SNR on surface coil. The disadvantage of the knee coil is that the coil diameter is not too large and inflexible so that in certain cases MRI examination or at knee large size cannot be done.

The advantage of flex coil is its flexible design so that it can be arranged in such a way that it can be as close as possible to the object and form the object to be examined, as described by Blink (16). Because the size is large enough and flexible so that it can be used on large enough objects. The shortage of flex coil when the MRI knee examination is done requires a longer time and produces image quality, namely with lower SNR compared to SNR volume coil and the possibility of wraparound artifacts, ie organ image artifacts that are not checked into the examined organs, so attention is needed which is specifically in positioning the knee of patients to be examined so as to provide optimal image quality results.

5. Conclusion

The results of calculation of SNR values of the knee anatomy through objective assessment, namely the ROI technique on the MRI operator console shows that there are differences in image quality, namely knee SNR on the use of volume coil (knee coil) and surface coil (flex coil). This is in accordance with the theory, one of which is in the book "MRI in Practice" by Catherine Wetsbrook, which mentions one that affects SNR, namely the radiofrequency coil. Knee MRI image results using sagittal slice with volume coil possess an average signal to noise ratio of 78.98, this value is higher than the MRI image knee using sagittal slice with surfaces coil with an average value of 67.2. With a difference of 11.78 or about 15% of SNR values of the knee anatomy using volume coil. Judging from the signal to noise ratio value of MRI examination knee is better to use volume coil. With differences in knees SNR using a surface coil that is not much different, namely 11.78 or about 15% of the knee anatomy uses coil volume.

The excess of the volume coil (knee coil) is its design in the form of volume and in accordance with the knee form so that it can provide a homogeneous image in the anterior and posterior regions and facilitate the MRI operator to adjust the position of the knee. The disadvantage of the knee coil is that the coil diameter is not too large and inflexible so that in certain cases MRI examination or at knee large size cannot be done. Meanwhile, the advantage of surface coil (flex coil) is that the design is flexible so that it can be arranged in such a way that it can form objects and can be used on large enough objects. Lack of flex coil during MRI knee examination takes longer and requires special attention in positioning the patient's knee to be examined in order to provide optimal image quality results.

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Sonographic Association between Fatty Liver and Gall Bladder Stones among all Adult Patients Visiting Private Clinics of Lahore City

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Abstract
Background: Fatty liver (chronic liver disease) was most commonly found associated with gall stones. It occurs due to the accumulation of lipid in hepatocytes mainly triglyceride. Due to a high incidence of obesity in the population, the risk of fatty liver and gall stones also increases. In Pakistani population, its prevalence of fatty liver was 10 - 14 %. Fatty liver and gall stones could easily be observed on ultrasound. Objective: To determine the association of fatty liver with gall stones in the patients younger than 50 years. Methods: This Cross-sectional descriptive study was conducted at Park view diagnostic center, Sharif Medical City Hospital, and Central Park Hospital. All the adult patients younger than 50 years diagnosed with gall stones were included. Ultrasound machine Toshiba Xario XG was used to perform this research to determine the association of fatty liver with gallbladder stones in the patient younger than 50 years. Fatty liver disease and gall stones were diagnosed on a trans-Abdominal scan by using a curved array transducer of 2.5 to 5MHz frequency. Results: Total 138 patients diagnosed with gall bladder stones were included, among them fatty liver disease was found in 95(68.8%) patients in which most of them were females. The individuals of 36-50 years were mainly involved while under the age of 30 years were rarely involved in gall bladder stones as well as fatty liver. Conclusions: We observed that gall stones are associated with fatty liver disease. Moreover, fatty liver disease was more common in females than males.

Keywords: Ultrasound, Gall Bladder, Gall Bladder Stones, Gall Stones, Fatty Liver Disease

Introduction

The fatty liver disease is a common health problem which sometimes represented by elevated liver enzymes. It occurs from the accumulation of lipid in hepatocytes mainly triglyceride[i]. It defines by the disturbance of at

least one of the liver function tests such as elevated alanine/aminotransferase and or gamma-glutamyl-transferase or ultrasound signs of fatty liver[ii]. Fatty acid metabolism problems are also accountable for the pathogenesis of fatty liver disease, which may be due to disproportion in energy intake and it's burning, resulting in lipid storage in the liver. Fatty liver is diagnosed when fat in the liver exceeds 5–10% by weight[iii] Hepatocyte death due to necrosis is increased in nonalcoholic steatohepatitis as compared to simple steatosis [iv],[v],[vi]. Fatty liver can develop into liver fibrosis and liver cancer as well[vii] .Liver function test (LFT, s) are not enough to confirm NAFLD. Liver biopsy is the only procedure that can differentiate NAFL from NASH[viii] . Risk factors include diabetes, a diet in high in fructose and older age[ix]. In United States, about 20% of population have non-alcoholic fatty liver[x]. Due to the high occurrence of obesity in the people, the risk of fatty changes in the liver also increases and it is a common feature observed in imaging. It might be develop up to 80% of obese and up to 20% in normal weight people[xi]. Different characteristic patterns of fatty changes in the liver can be identified such as diffuse, geographical, focal, subcapsular and peri-vascular[xii]. For diagnosis of fatty liver disease, the sensitivity of ultrasonography was 100% and specificity 60%[xiii]. However, gold standard for the diagnosis of NAFLD and NASH is liver biopsy [xiv].

Gall bladder stones is also a most common gastrointestinal disorder. The prevalence of gall bladder stones in general population is 10- 15 %[xv]. There is a very likely a chance co-occurrence of both gall bladder stones and fatty liver disease because of the high prevalence[xvi]. Both of them also share same risk factors, and both diseases are linked to obesity/ overweight, hypertriglyceridemia[xvii].According to the composition, there are eight main types of gallstones including pigment stones, cholesterol stones, calcium carbonate stones, calcium stearate stones, phosphate stones, cystine stones, protein stones, and mixed stones. The most common type of gallstones are cholesterol stones and second most common are pigment stones.[xviii]

Ultrasound is the first line imaging modality for diagnosis of gall stones. It is non-invasive, widely available and cost effective as compared to other imaging modalities. Gall bladder stones was diagnosed as the sonographic evidence of one or more distally shadowing mobile or non-mobile structures seen within the gall bladder.[xix]

Methods

A Cross sectional descriptive study was conducted at Park view diagnostic center, Sharif Medical City Hospital, and Central Park Hospital. Our sample size was 138 patients. 138 patients were included after the approval of synopsis from institutional review board (IRB). All the adult patients younger than 50 years diagnosed with gall bladder stones were included. Ultrasound machine Toshiba Xario XG was used to perform this research to determine the association of non-alcoholic fatty liver with gallbladder stones in the patient younger than 50 years. Fatty liver disease and gall bladder stones was diagnosed on trans-Abdominal scan by using curved array transducer of 2.5 to 5MHz frequency. Figure 1 shows a trans-abdominal scan of 45 years old female in which deep part of liver appears dark and obliterating the echogenic diaphragm in the presence of gallstones. Trans-abdominal scan of 36 years old female in which deep part of liver appears mild hypo-echoic in the presence of gallstones in Figure 2.

Results:

In this study total frequency of the patients was 138 comprising 99 females (71.7%) and 39 males (28.3%). Mean age of the patients was 39.10±8.1 (22-50 years). Graph number 1 shows descriptive statistics of age in years. Frequency in marked Fatty liver was 1 (0.7%)

Frequency in mild Fatty liver was 73 (52.9%), moderate fatty liver was 21(15.2%), and normal liver was 43(31.2%). Demographic details of grade wise fatty liver are given in Table-1. Graph number 2 shows gender wise grade cross tabulation.

Figure- 3 Descriptive statistic of age in years.

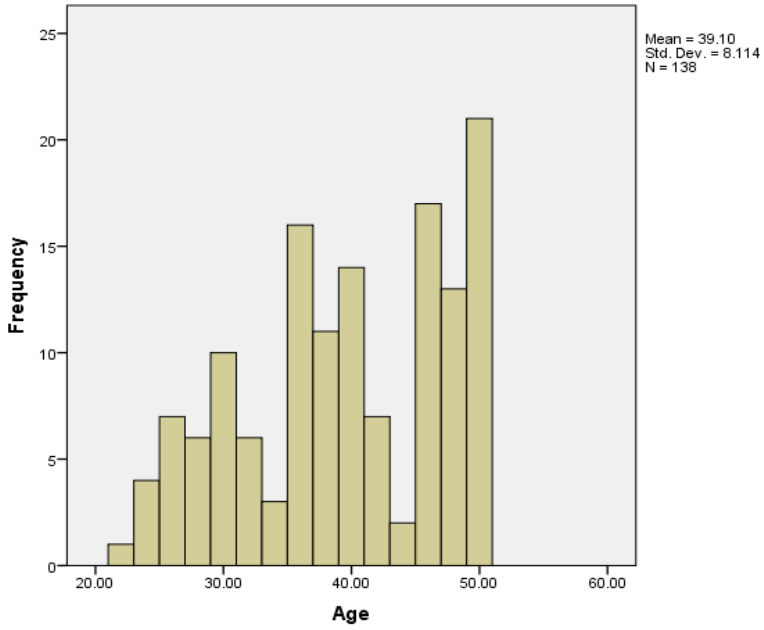
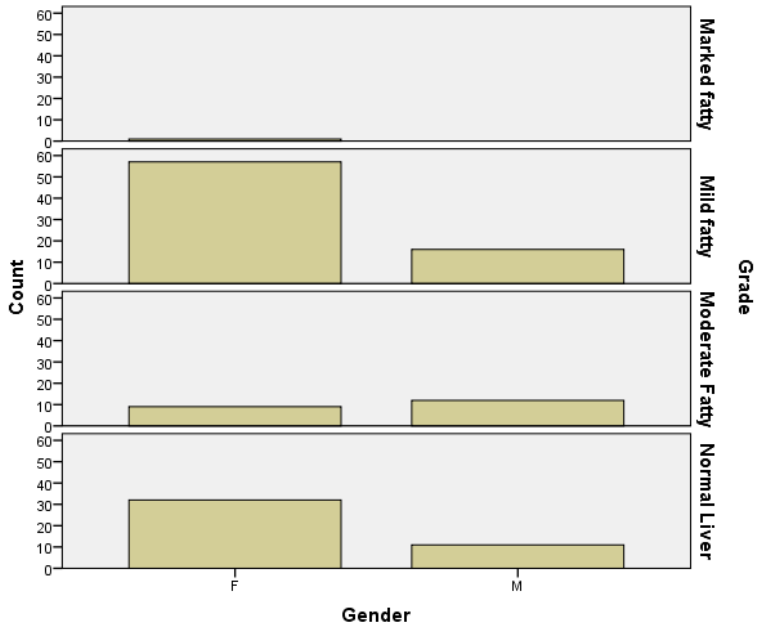


Table-1 Grade wise Fatty liver

	Grade	
	Frequency	Percent
Marked fatty	1	0.7
Mild fatty	73	52.9
Moderate Fatty	21	15.2
Normal Liver	43	31.2
Total	138	100.0

Figure -4 Gender wise grade cross tabulation



In current study, it was noted that there was association between gall bladder stones and fatty liver disease. A study was performed by Mohammad H et al. in 2014 determined the preference between fatty liver disease and cholesterol gallstones. Both conditions are highly prevalent in the general population and include multiple risk factors such as obesity, insulin resistance, dyslipidemia, and high dietary cholesterol intake[xx].

Another study was accomplished at civil hospital Karachi in surgical unit 1. In this study, selective sample comprising 88 patients was involved of both genders with ultrasonographic evidence of gallstone regardless of cholecystitis. This study found an association between metabolic disorder with gallstone and fatty liver disease. The huge proportion of first degree relative of gallstone patients had the gallstone in this relation, was more noticeable who had associated fatty liver disease[xxi].

A systematic review of studies was carried out in 2015 to explore the relationship between fatty liver and gallstone and its risk factors. Eight studies were conducted which consists of 43,749 people from different ethnics and regions. Five trials were carried out in subgroups of gallbladder disease patients in the NAFLD population. As a result of this study, a significant association was noticed between NAFLD and gallstone disease[xxii,xxiii]. The results of the current study agree with the data published in international research articles.

Conclusion

We observed that gall stones are associated with fatty liver disease. Moreover, fatty liver disease was more common in females than males.

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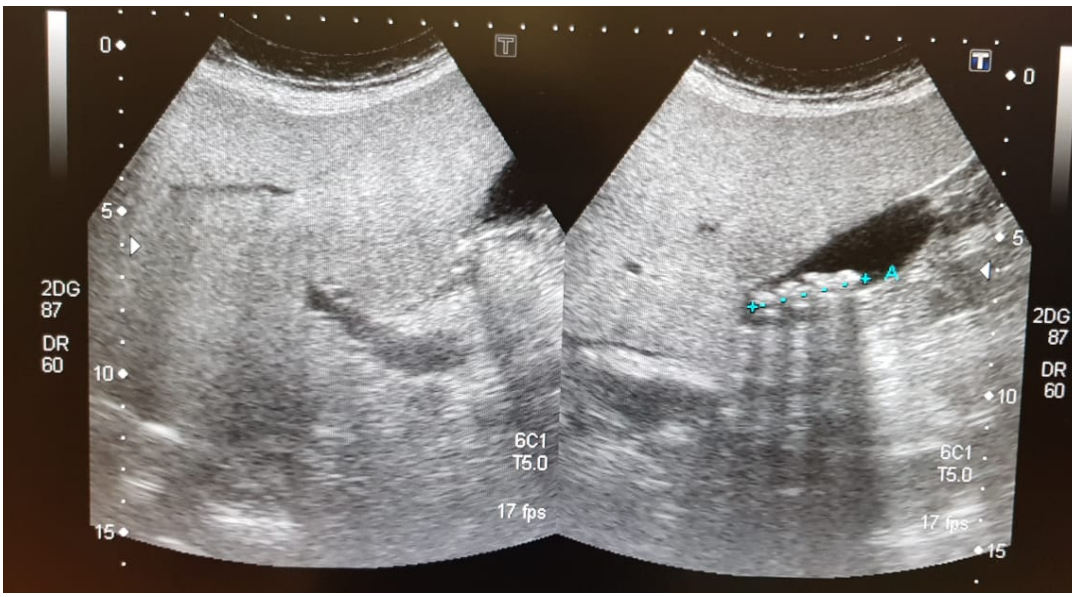
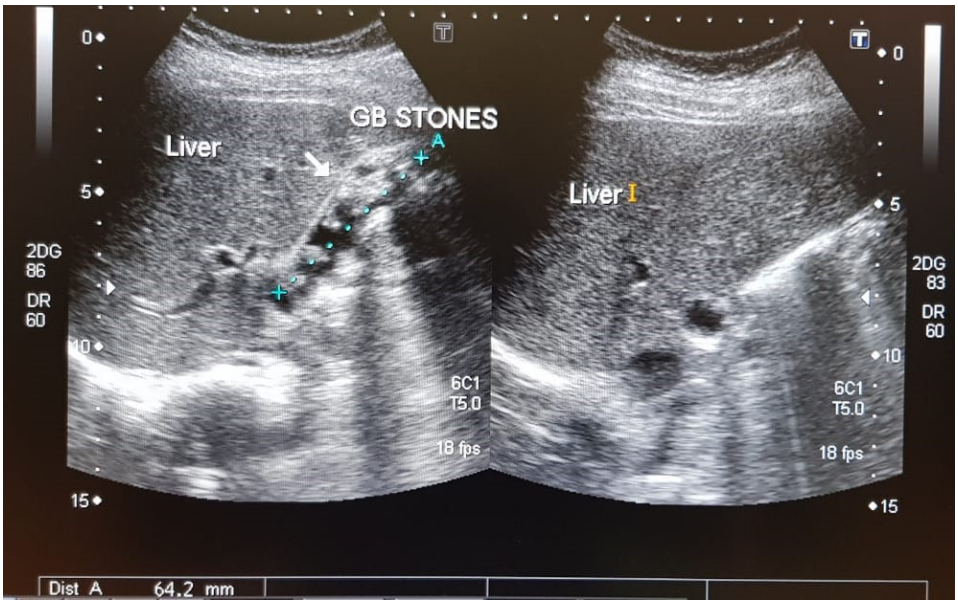
Appendix 1: Image 1



Appendix 2: Image 2



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Hypertension a Cause and Concern for Various Cardiovascular Diseases in Male and Female Population

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Abstract
Hypertension is the leading cause for the onset of many cardiovascular diseases and a predominant health care burden in Arab countries. Increased prevalence of hypertension is observed in obese teens, and adult population increases the risk for many cardiovascular diseases, renal functional derangement, and cerebral stroke. The present study aims to find out the prevalence of hypertension among male and female populations in the Wadi Aldawasir region of Saudi Arabia. Data were collected from the medical record for the patient visiting Wadi Aldawasir general hospital during the period of 2014-2018. Off the total of 347 male and female populations, 234 were diagnosed with hypertension that accounts for 67 percentages. Among, 347 total patients, 137 were female, and 97 were male. The result of the study showed that the prevalence of hypertension was higher among both male and female adult. However, the incidence of hypertension was more in female compared to male. Considering the observed prevalence of hypertension in both male and female population and because of the subsequent outcomes of hypertension on the cardiovascular functioning, therapeutic intervention, and effective community-based health care programs in educating the people about the risk factors of hypertension is required in this region of Saudi Arabia.

Keywords: Cardiovascular Disease, Hypertension Female, Male, Medical Record

Introduction

Cardiovascular disease comprises of diseases of blood vessels, and heart wherein death occurs due to narrowed, obstructed or hardened blood vessels of the heart such that the tissue doesn't receive enough nutrients and oxygen to carry out the normal function. [1] Cardiovascular disease is difficult to be diagnosed until the underlying condition worsens to the point of myocardial infarction, stroke and sudden cardiac death. [1] Numerous studies have shown that increased prevalence of diabetes mellitus, obesity, and hypercholesterolemia as the major risk factor for cardiovascular diseases.[2, 3] This dramatic rises in the occurrence of cardiovascular diseases to an alarming rate in the last two decades poses a major public health problem.[4] According to health statistics, 28–30% of total deaths in the Arab countries were due to cardiovascular diseases such as myocardial infarction, coronary artery disease, stroke, and peripheral arterial disease.[5, 6, 7.] The cardiovascular disease-related mortality rate can be reduced by decreasing known risk factors. Among the various risk factor like obesity, dyslipidemia, and diabetes mellitus,[2] hypertension is emerged out to be a globally well-established and important risk factor for cardiovascular morbidity and mortality. Studies have shown that hypertension is considered to be the strongest risk factor for various cardiovascular events such as myocardial infarction, heart failure, peripheral

arterial disease, stroke, and renal failure. [8-10] Stroke mortality because of hypertension is by far the most important risk factor for fatal cerebral stroke. A close relationship between the prevalence of hypertension and fatal stroke has been reported.[11]

Although significant progress has been made in increasing the awareness, improvement in the treatment and control of hypertension, the statistic remains high regarding the prevalence of hypertension.[12] The situation needs to be addressed frequently or on a timely bases. And looking on to the fast-changing sedentary lifestyle, obesity and eating fast food rich in salt and sugar, there is a greater chance of an increase in the rate of prevalence of hypertension. Not addressing the prevalence of hypertension, the risk of various cardiovascular diseases like coronary artery disease, left ventricular hypertrophy including cerebral stroke and renal failure increases greatly. Studies have suggested that deaths from stroke in the Middle East will nearly double by 2030.[13] and by 2020 mortality from ischemic heart disease in developing countries is expected to increase by 120% for women and 137% for men.[14] And this could be attributed to the fast increasing rate of hypertensive individuals. This increased prevalence rate of hypertension would be attributed to adaptation to sedentary lifestyle, obesity, and consumption of fast food rich in salt and sugar. Hence present study aims to evaluate the prevalence of hypertension among male and female population in this region of Saudi Arabia. In order to avoid false hypertension diagnosis through any error in the measurement, we purpose to evaluate the prevalence rate of hypertension through the patient clinical data from hospital medical record.

Methods

Data to investigate was collected from both male and female patients visiting the ward of Wadi Ad Dawasir general hospital between the years 2014 to 2018. The survey is a systematic random sample of patient visit based on hospital record. Ethical approval is obtained to carry out the research. A total of 347 patient's medical record data was assessed.

Results

Of the total 374 patients, 167 were female patients, and 180 were male patients. Among female 137 outs of 167 were diagnosed with hypertension which accounts for 80 percent and among male a total of 180 patient medical records was analyzed, of which 97 patients were hypertensive individuals, which accounts for 53 percent. Off the total of 347 male and female populations, 234 were diagnosed with hypertension that accounts for 67 percentages. Among, 347 total patients, 137 were female, and 97 were male. (Table-1 and Figure-1). The result of the study showed that the prevalence of hypertension was higher among both male and female population. However, the incidence of hypertension was more in female compared to male population.

Table1: Prevalent of hypertension among male and female patients visiting the Wadi Aldawasir General Hospital during the year 2014 to 2018

Cardiovascular risk factor	Female	Male
Total of number of Patients	167	180
Hypertensive	137	97

Figure 1: Prevalent of hypertension among male and female patients visiting the Wadi Aldawasir General Hospital during the year 2014 to 2018

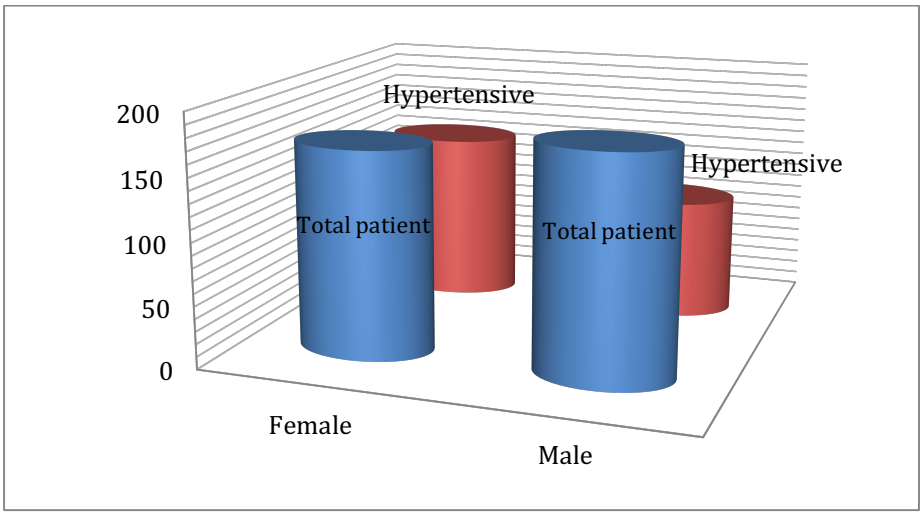
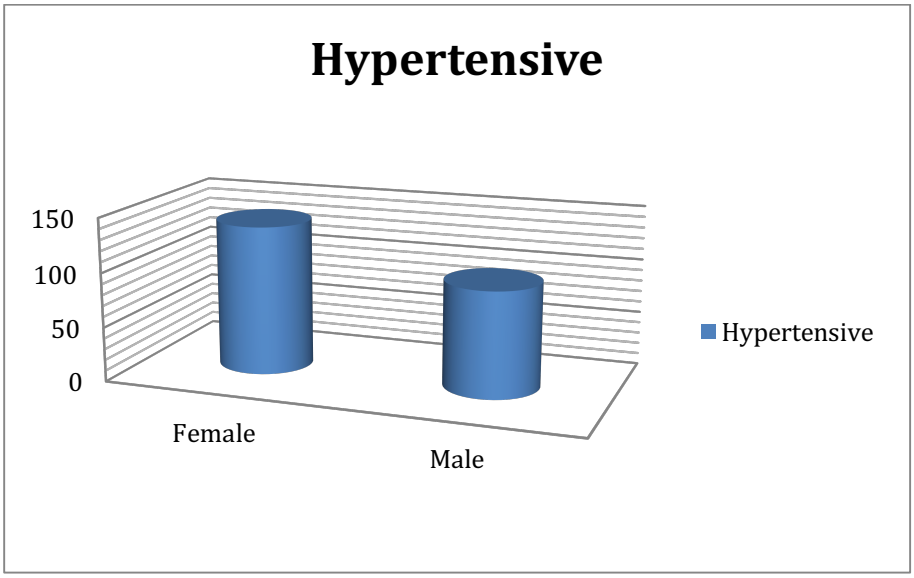


Figure 2: Comparison of the prevalence of hypertension among male and female patients



Discussion:

Increased prevalence of hypertension is reported mainly in developing countries and is the predominant cause for the onset of many cardiovascular diseases. Hypertension was classified as the leading risk factor for cardiovascular-related deaths in Saudi Arabia.[15] Hypertension leads to left ventricular hypertrophy, myocardial infarction 16, coronary artery disease, [17] atherosclerosis, [18] chronic kidneys disease[19] cerebrovascular diseases [20], and [21] peripheral vascular diseases .[22]

Recent cross-sectional studies have explained about the increasing prevalence of hypertension in different parts of the Kingdom of Saudi Arabia.[23] Although numerous studies have shown the prevalence of hypertension and its risk factor in Saudi Arabia The highest prevalence of hypertension in Saudi Arabia has been reported from the Al-Qasim and Aseer region.[15,23]

Unlike other studies, our study presently includes survey through hospital-based data from the medical record on the prevalence of hypertension among male and female patients visiting the Wadi Al Dawasir general hospital in a period of four years from 2013 to 2018. Further, the prevalence of hypertension in this part of Saudi Arabia has not been studied earlier. We reported that there was an increased percentage of both male and female diagnosed with hypertension. Furthermore, the percentage of women suffering from hypertension is more compared to men. The increasing prevalence of hypertension could possibly make people susceptible to cardiovascular diseases. Coronary disease in male and stroke in the female are the major first cardiovascular events noted after hypertension onset, as observed from data of Framingham Heart Study.[24] Despite a vast development in the management of prevention, treatment, and control of high blood pressure, hypertension remains a major public health problem.

Hypertension remained a leading risk factor for death in the Kingdom of Saudi Arabia and accounted for about 24% of total deaths from cardiovascular and circulatory diseases. Twenty-five maintaining blood pressure below the hypertensive or prehypertensive levels will prevent the risk of cardiovascular disease during a lifetime. Patients who remained healthy had significantly lower blood pressure (121/79 versus 134/83 mmHg) compared to the patients who have cardiovascular diseases with an increase in the blood pressure compared to the healthy individual.[26]

Unhealthy diet, physical inactivity, and obesity are some of the important responsible factors as suggested by experts.[6, 27] Further it is reported that one of the anthropometric parameters strongly related to hypertension is obesity in Saudi adult population that is measured in terms of waist circumference.[28] Waist circumference stands as a risk factor for hypertension. Reports have suggested that the percentage of obesity among the adult population in Saudi has tremendously increased. Obesity and hypertension greatly increase the mortality rate due to cardiovascular and kidney disease.[29]The percentage of obesity is more in female than the opposite sex.[30] Studies have suggested that obesity is one of the causes of chronic diseases like high blood pressure.[31]Increased prevalence of hypertension in women than men could be related to the increasing obesity rate in women and increase hypertension percentage in female than male in our study. We propose that obesity could be one of the causes of an increased rate of hypertension in the female.

Hypertension remains asymptomatic for years before letting the person into cardiovascular and cerebral complication hence commonly mentioned to as a "silent killer".[32] Hypertension is one of the most common conditions that require lifelong treatment, and there is ample evidence that such treatment substantially reduces the risk of cerebrovascular accidents and coronary artery disease [33-36]. Thus it is important to measure blood pressure in a regular manner, using a home blood pressure monitoring device. This will be a great way of Preventing and treating hypertension. Eating healthy food and limiting salt intake, smoke quitting, exercising regularly and maintain a normal (BMI) body mass index, are some of the risk factors for hypertension should be brought into notice to the people in order to prevent the increasing prevalence of hypertension. It is well recognized that effective management of hypertension reduces the occurrence of myocardial infarction, stroke and vascular complications[32,17] Antihypertensive drugs should be considered to prevent cardiovascular hazards if the successive blood pressure recordings are above the hypertensive levels. Antihypertensive therapy and improved lifestyle have brought a dramatic reduction in these cardiovascular events. A recent study provides evidence-based intervention on the prevalence of hypertension among the adult population. This study helps to further strengthen the strategies by the health care sector in reducing the incidence of hypertension and cardiovascular diseases in the female and male adult population. Sustained and coordinated action will be required to prevent disease. The main strategy that involves overcoming this problem is community-based prevention and health care programs about the risk factors. The community-based approach will be fruitfull through joint collaborative efforts between health providers and the community. [37]

Conclusion

Thus, it concluded that hypertension is the most prevalent risk factor reported among adult men and women. As known from the earlier studies the onset of hypertension is the risk factor for various cardiovascular diseases like stroke, myocardial infarction and left ventricular hypertrophy. There is an urgent need for awareness among the adult population about the increased prevalence of hypertension and its complication on the cardiovascular

system. Healthy lifestyle such as weight monitoring, less sugar and salt diet food, exercise and cessation of smoking are some of the preventive measure needed to decrease the prevalence of hypertension among adult.

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Sonographic Correlation of Gestational Age with Umbilical Cord Diameter in Second and Third Trimester

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Abstract
Background: Commonly fetal parameter for gestational age (GA) assessment have pitfall mostly in progressive pregnancy and pregnancy complicated by fetal structure abnormality. Objective: Correlating of gestational age in the second and third trimesters with umbilical cord diameter. Methods: A cross-sectional sonographic study of 370 pregnant women with gestational age from 14 weeks to 40 weeks was done in Government Tehsil Headquarters Hospital Kahn a nau Lahore, Ferozpur Road, Lahore. The gestational age was first estimated using Naegele's GA estimation formula based on the starting date of the last menstrual period of each subject. Fetal parameters like biparietal diameter, femur length, circumference of the head and abdominal circumference have been used to estimate gestational age. The umbilical cord diameter has been measured to find a correlation between gestation age and umbilical cord diameter. Results: The fetal parameters and umbilical cord diameter increase in the fetus as the gestational age increases. There seems to be a linear relationship and significant statistical correlation ($p<0.05$) in between umbilical cord diameter and the gestational age estimation. The umbilical cord diameter appeared to increase by the rate of 1mm/week between 14TH to 40TH weeks of the gestational period. Conclusions: The umbilical cord diameter has a strong linear relationship with commonly used parameters for the assessment of fetal gestational age and is able to use as a reliable method to evaluate fetal growth as well as prediction of gestational age.

Keywords: Umbilical Cord, Gestational Age, Sonography, Last Menstrual Period, Biparietal Diameter (BPD)

Introduction

The precise knowledge of gestational age is an important decision of both prenatal care with the successful delivery of babies (Rostamzadeh, Kalantari, et al. 2015). Gestation lasts approximately 40weeks(280days), calculate since the first day of the woman's last menstrual period of the woman (LMP) (Olesen, Westergaard, et al. 2004). Unfortunately, the gestational age estimate based on last menstrual period is often unsuitable for as many women, especially women without history (Rostamzadeh, Kalantari, et al. 2014).

Fetal parameters such as biparietal diameter (BPD), femur length (FL), abdominal circumference (AC)and head circumference (HC), commonly used to estimate gestational age. (Leung, Pang, et al. 2008).

The difference in measuring techniques ultrasound measurement tends to reduce accuracy (Lee, Kirk, et al. 2000). Measuring the head circumference (HC) as a gestational age predictor compensates for BPD deficiencies due to head shape, However measuring head circumference is often technically more difficult and has a higher degree bias of observer (Lobo, Favorito et al. 2011).

In addition, the measurement of FL for dating at later stages in pregnancy is considered unreliable, since the femur, in some cases, foreshortened appear and can therefore not provide accurate (Abd AL-fadel 2017). GA in cases of dwarfism abdominal circumference in the later stage of pregnancy measurement was considered to be the most important fetal dimension, However, the fetal size/weight is more reflective than the gestational age (Cromi, Ghezzi, et al. 2007).

The accuracy of fetal parameters as gestational age scheduler can increase or decline as pregnancy progresses (Tanner 1998). For example, biparietal diameter (BPD) is accurate to gestational age in the second quarter by + 10 days and + 21 days in the third quarter. Similarly, in the second trimester, Femur length is accurate to GA by + 6 days, while in the third trimester, GA by + 14 days. 4, 5 Since 20 weeks of gestation (Cromi, Ghezzi, et al. 2007, Abd AL-fadel 2017).

An important fetal-maternal unit is an umbilical cord with a vein and two arteries. It module blood from the placenta to the fetus (Heifetz 1996). This study estimated a strong co-relationship in between umbilical cord diameter and gestation age in second and third trimesters (Raio, Ghezzi, et al. 1999).

Methodology

This comparative and cross-sectional study was carried out at Government Tehsil Headquarters Hospital Kahn a nau Lahore, Ferozpur Road, Lahore, while 370 individual were recruited. This research was started after the Approval of the Institution Review Board (IRB). The duration of the study was three months (October 10, 2018, to January 10, 2019). The patient was briefly explained the research procedure and the objective of the study to correlate gestational age with umbilical cord diameter in the second and third trimester. 370 pregnant women are subjected to routine obstetric scanning in the second and third trimesters.

Every pregnancy is a singleton. Complicated pregnancies such as IUGR, multiple pregnancies, Oligohydaminos, Anhydramnios, diabetic and hypertensive are excluded. The diameter of the umbilical cord measured in mm and tabulated BPD, AC, HC, FL. The age of gestation determined by the formula of Nagele (i.e., EDD determined by adding 7 days and 9 months to LMP). Only transabdominal sonographic examinations were performed in the supine position. Commonly considered parameters of fetal for gestational age estimates such as HC, FL, AC, and BPD were all measured in accordance with departmental protocols, These measurements sonography estimate the gestational age as shown in (fig:1) by using the scanner based on Hadlock et al. 1985 proposed formula. Umbilical cord measurement only is taken when the outer edges of the cord were outlined in a longitudinal plane as shown in (fig:2). The ultrasound machines of Mindray Z5, Toshiba xario 100 and Samsung HS 40 with convex transducer probe of 3- 5 MHz and linear array with a 7-12 MHz frequency was used. The gestational age estimation was based on a reliable collection of date of onset the last menstrual period (LMP) and validated by ultrasound scan done within 2^{nd} and 3^{rd} trimester of pregnancy. All patient data were analyzed on Statistical Package for the Social Sciences (SPSS) is a software package used in statistical analysis of data. It

was developed by SPSS Inc. and acquired by IBM in 2009. In 2014, the software was officially renamed IBM SPSS Statistics.

Fig 1: Grayscale ultrasound measuring the (BPD) and FL

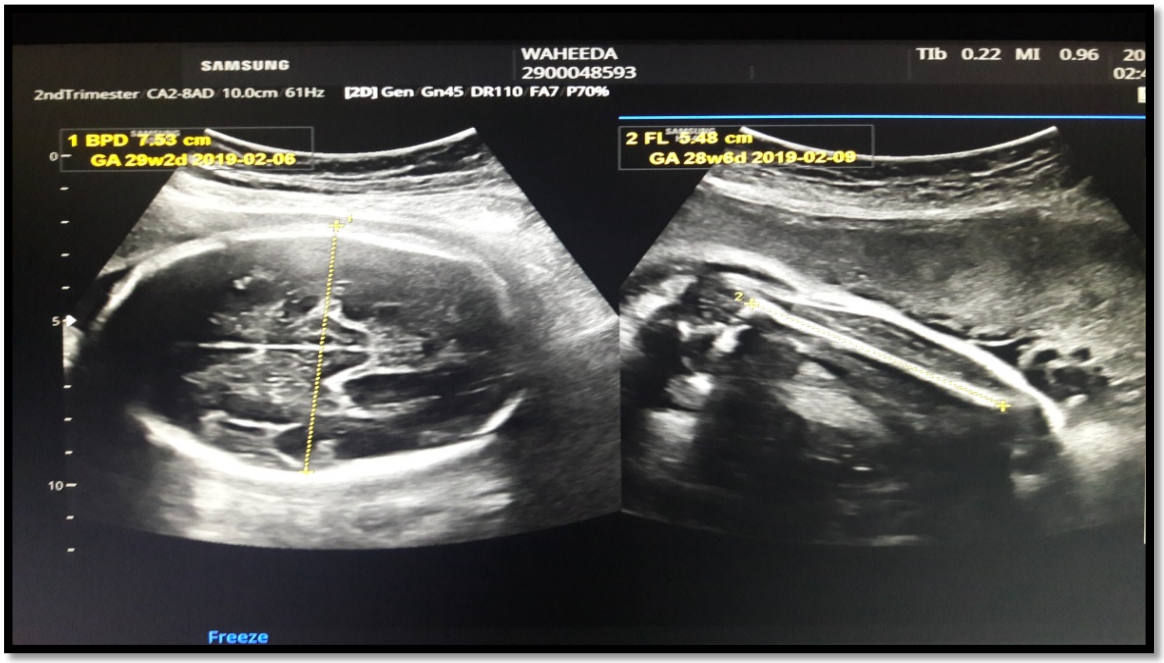
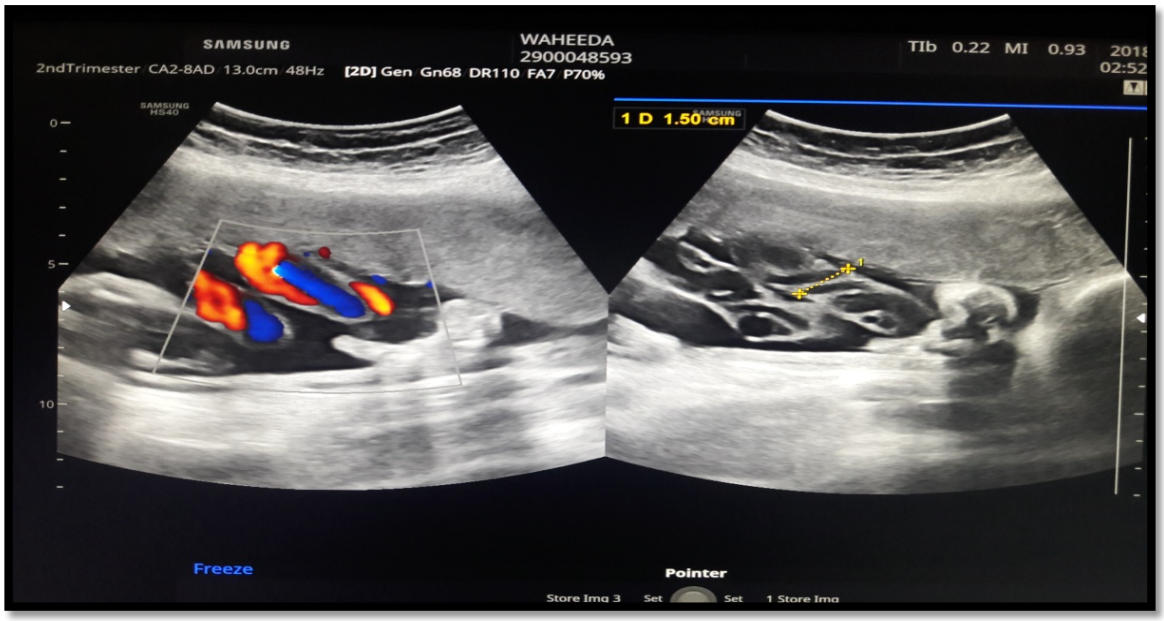


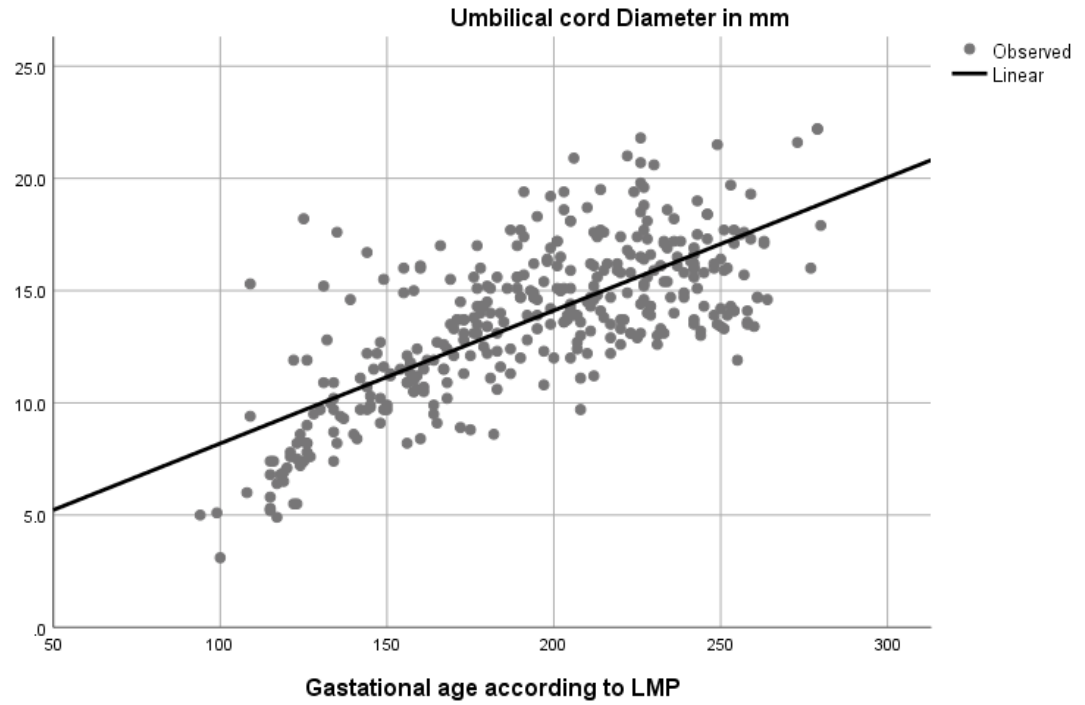
Fig 2: Measures the umbilical cord Diameter on grayscale with color Doppler



Results

The mean cord diameter is around 3.10 $\pm$ S.D mm at the beginning of 2nd trimester (14th wk) while it is around 22.2 $\pm$ S.D mm at last trimester (40th wk) and the significant value ($p < 0.01$) as shown in (table1 and table 2).The findings showed that the cord diameter increases gradually as pregnancy advances (at the rate of approx 1mm/wk). There were linear relationship and statistically significant correlation between umbilical cord diameter and gestational age. Data on Umbilical cord diameter, gestational age (USG), gestational age (LMP), were collected 370 cases and entered into Statistical Package for the Social Sciences (SPSS) 24.0 software for

analysis. Descriptive analysis, mean, SD, correlation and regression analysis were undertaken (Graph 1 :). Scatter plot shows that cord diameter appears to increase as (GA) increased.



Graph 1: Scatter plot of umbilical cord Diameter Vs (GA) estimated by LMP

Discussion

The main observation of this study is that the umbilical cord diameter and either gestational age are strongly related(Ghezzi, Raio, et al. 2001). The accurate knowledge of the gestational age (GA) depends largely on the achievement of the best possible prenatal care and successful pregnancy outcome (Ghezzi, Raio, et al. 2002). Ultrasound has remained an important imaging method in the estimation of GA (Hill, DiNofrio, et al. 1994). Many authors using multiple fetal parameters on ultrasound for measuring gestational age(Mital, Gupta, et al. 2014). A cross-sectional study of the umbilical cord to estimate gestational age has been reported in a previous study; In our study mean umbilical cord diameter is 13.70 $\pm$ S.D mm. This result is slightly different from the previous study in which the mean umbilical cord diameter was 15$\pm$ SD mm (Eze, Ugwuja, et al. 2014). However, our study is extensively smaller than the mean umbilical cord diameter found in the 20mm report in a Turkish population (Deen, Hill, DiNofrio, et al. 1994). The umbilical cord Diameter mean in our study, appears significantly larger than 191mm2 as reported in Indian subjects (Tahmasebi and Alighanbari 2011). These variations were not investigated in the study. It is likely; the variation in the mean of umbilical cord sizes may suggest environmental differences in the development of umbilical cord.

The fluctuation in our and previous study due to different umbilical cord protocol applied by a different observer. Table (1) presented the Mean and Std Deviation of gestational age according to sonography, gestational age according to LMP and Umbilical cord Diameter in mm. In (figure 3): Graph of umbilical cord Diameter Vs (GA) estimated by LMP shows the strong correlation between the umbilical cord diameter and the gestational age by last menstrual Period (LMP) in weeks. The umbilical cord diameter increased at the rate of 1mm/week from the 14th-40th week of gestation in our study. Mean umbilical cord diameter was also found to increase steadily as pregnancy advances. In the present study umbilical cord diameter increased as reported in a previous study (Ghezzi, Raio et al. 2001) as pregnancy advanced umbilical diameter positively correlated (r=0.973 and r=0.974 respectively) with GA. Results of the present study also near to Weismann and Drugan. Who reported a strong positive correlation between umbilical cord (diameter) and gestational age. Furthermore, Gehzziet al16 had equally reported that sonographic cross-sectional diameter and area of umbilical cord

increased as cyesis advanced while Togni et al21 336had earlier reported a significant correlation between cord diameter and gestational age. Thus results of the present study supported previous study and opinions or suggestions. That sonographic measurement of umbilical cord important tools for the assessment of fetal growth. Which is proven by the result of the table. (Table2 and Table 3). The correlation between the gestational age according to LMP and the sonography of the gestational age was compared separately with the umbilical cord diameter (UCD) and the significant value ($p < 0.01$) relationship between the umbilical cord and gestational age.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Gestational age according to sonography	370	98	279	189.93	41.164
Gastational age according to LMP	370	94	280	193.11	42.702
Umbilical cord Diameter in mm	370	3.1	22.2	13.707	3.4832
Valid N (listwise)	370				

Table 2: Correlation GA according to sonography with Umbilical cord diameter in mm in different trimester indicated a very high level of correlation ($p <0.01$) within themselves in the second trimester, third trimester and overall.

		Gestational age according to sonography	Umbilical cord Diameter in mm
Gestational age according to sonography	Pearson Correlation	1	.750**
	Sig. (2-tailed)		.000
	N	370	370
Umbilical cord Diameter in mm	Pearson Correlation	.750**	1
	Sig. (2-tailed)	.000	
	N	370	370

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3: The correlation of GA according to (LMP) with Umbilical cord diameter in mm in different trimester indicated a very high level of correlation ($p <0.01$) within themselves in the second trimester, third trimester and overall.

		Umbilical cord Diameter in mm	Gestational age according to LMP
Umbilical cord Diameter in mm	Pearson Correlation	1	.726**
	Sig. (2-tailed)		.000
	N	370	370
Gestational age according to LMP	Pearson Correlation	.726**	1
	Sig. (2-tailed)	.000	
	N	370	370

**. Correlation is significant at the 0.01 level (2-tailed).

Since the umbilical cord diameter has an accurate estimation of gestational age; it is recommended to be part of a routine ultrasound evaluation and as a routine part of prenatal care as it can greatly impact obstetric management

and improve ante partum care. UCD measurement should prompt the physician to carefully evaluate the case whenever there is an incongruity between the observed and the normal values using ultrasound, as it is the modality of choice for the assessment of gestational age in the first and second and third trimester of pregnancy as it is the modality of choice for the assessment.

Conclusions

Umbilical cord diameter has a strong linear relationship with commonly used parameters for the estimation of fetal gestational age and can be used as a reliable method to evaluate fetal growth and prediction of gestational age.

Coefficients

Unstandardized Coefficients		Standardized Coefficients
B	Std. Error	Beta
71.059	6.212	
8.905	.439	.726

a. Dependent Variable: Gestational age according to LMP

(**table:** 3). Show significant value.

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Wellbeing at Work and the Lie Scale

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Abstract
This article describes the "Wellbeing Process" model which is based on the Demands-Resources-Individual Effects (DRIVE) approach developed in occupational stress research. This model requires measurement of many variables and this is often not practical with established questionnaires due to their length. In order to remove this problem a short questionnaire (the Wellbeing Process Questionnaire, WPQ) was developed and validated. This enabled the well-being process to be evaluated and established predictors of positive and negative appraisals and outcomes defined. Results using this measuring instrument in a range of samples from different occupational sectors will be described. One issue with measures of wellbeing at work is that they may be influenced by the extent to which the person aims to present a socially desirable profile or lie about their wellbeing. This was examined in the study presented here. The results showed that measures related to negative outcomes were associated with scores on the lie scale. In contrast, positive outcomes and "the good job score" (the difference between positive appraisals/outcomes and negative appraisals/outcomes) were not correlated with scores on the lie scale. This result demonstrates the suitability of the WPQ for investigating wellbeing at work.

Keywords: Wellbeing, Occupational Health, Lie Scale

1. Introduction

Our approach to wellbeing at work has been to consider it as a process. This was based on occupational stress research and the development of the Demands-Resources-Individual Effects (DRIVE) model (Mark & Smith, 2008, 2011, 2012, 2018a, 2018b). This model emphasised the importance of measuring potentially negative job characteristics, such as job demands, resources that help one deal with challenges, such as control and support, and individual differences in coping styles. A major feature of the model was that it is relatively easy to add new variables. This has led to the inclusion of positive outcomes, such as life satisfaction, positive affect and happiness (Smith, 2011a, 2011b; Smith & Wadsworth, 2011; Smith, Wadsworth, Chaplin, Allen, & Mark, 2011; Wadsworth, Chaplin, Allen, & Smith, 2010). These positive outcomes are generally referred to as wellbeing. Our approach to wellbeing has been to include both positive and negative job characteristics (e.g. demands, control and support), appraisals (e.g. perceived stress and job satisfaction), individual differences (e.g. positive personality and negative coping) and outcomes (anxiety/depression and happiness). Other variables that have been included in the model relate to ethnicity (Capasso, Zurlo, & Smith, 2016a, 2016b, 2018; Zurlo, Vallone, & Smith, 2018), psychological contract fulfilment (Ahmad, Firman, Smith, & Smith, 2018a, 2018b), resilience, burnout and work-life balance (Omosehin & Smith, 2019) and training attitudes (Nor & Smith, 2018).

The addition of many factors leads to very long measuring instruments which reduce compliance and take time to complete. The Wellbeing Process Questionnaire (WPQ - Williams & Smith, 2012, 2016, 2018a, 2018b; Williams, Pendlebury & Smith, 2017; Williams, Thomas & Smith, 2017) and the Smith Wellbeing Questionnaire (SWELL – Smith & Smith, 2017a, 2017b, 2017c; Fan & Smith, 2017a, 2017b, 2018) were developed based on the use of short items that were shown to be highly correlated with longer established measuring instruments. These short questionnaires have been shown to have good reliability and validity. As well as in extensive cross-sectional research, the WPQ has been used in longitudinal studies which provide a better indication of causality (Galvin, 2016; Nelson, 2017). One potential problem with all measures of wellbeing at work is the extent to which they are influenced by the person trying to give a favourable impression of themselves. This has led to the development of "lie scales" which provide the researcher with a measure that can be co-varied to adjust for favourable impression biases (Eysenck & Eysenck, 1991; Framingham, 2019).

The aim of the present study was to examine whether associations between the predictor variables of the WPQ and outcomes were influenced by impression management (scores on the lie scale). These analyses were carried out for both positive and negative outcomes independently and combined into a single "good job" score (the difference between the positive outcomes/appraisals and the negative outcomes/appraisals).

2. Methods

This study involved a survey of the well-being of university staff. It was carried out with the informed consent of the volunteers and approval from the ethics committee, School of Psychology, Cardiff University. University staff (academic, technical and administrative) were recruited by an advert on the university noticeboard and were asked to complete an online survey presented using Qualtrics software. They were paid £10 for completing the survey, which is shown in Appendix 1.

2.1 Participants

One hundred and fifteen members of staff (age range 21-60 years; 37 male; 66 single; 106 white British) completed the survey.

2.2 Measures

The following measures were derived from the survey:

- Negative job characteristics
- Positive job characteristics
- Positive personality
- Negative coping
- Positive outcomes
- Negative outcomes
- Difference between positive and negative outcomes
- Lie scale score

2.3 Statistical analysis

The above measures were dichotomised using a median split and logistic regressions carried out with the positive and negative outcomes, and the difference between them as dependent variables.

3. Results

The first logistic regression carried out used negative outcomes as the dependent variable. The results are shown in Table 1 and there were significant effects of the lie scale and the absence of positive work characteristics.

Table 1. Significant predictors of negative outcomes

Variable	B	S. E.	Wald	df	Sig.	Exp (B)	CI lower	CI higher
Lie scale	1.087	.425	6.549	1	.010	2.214	1.290	6.821
Positive work	-1.097	.463	5.602	1	.018	.334	0.115	0.828

The second logistic regression used positive outcomes as the dependent variable. There were significant effects of positive personality and positive work characteristics. There was no significant effect of lie scale scores.

Table 2. Significant predictors of positive outcomes and the lie scale

Variable	B	S.E.	Wald	df	Sig.	Exp (B)	CI lower	CI higher
Positive personality	1.703	.503	11.459	1	.001	5.489	2.048	14.710
Lie scale	.745	.520	2.054	1	.152	2.107	0.760	5.849
Positive work	2.361	.525	20.229	1	.000	10.605	3.790	29.676

The final regression used a composite wellbeing score (positive outcomes – negative outcomes) as the dependent variable. This again showed significant effects of positive personality and positive work characteristics but no significant effects of the lie scale.

Table 3. Significant predictors of wellbeing (positive outcomes – negative outcomes) and the lie scale

Variable	B	S.E.	Wald	df	Sig.	Exp (B)	CI lower	CI higher
Positive personality	1.650	.472	12.216	1	.000	5.208	2.064	13.140
Lie scale	0.95	.479	.039	1	.843	1.100	0.430	2.810
Positive work	1.740	.498	12.189	1	.000	5.698	2.145	15.134

4. Discussion

The development of the wellbeing process model has involved several stages. The first was the development of a conceptual framework based on the DRIVE model. This model included positive and negative job characteristics, appraisals and outcomes. In order to adopt a multi-variate approach it was important to measure a large number of different factors. To do this using many of the established questionnaires would have resulted in extremely long surveys which would have reduced compliance and would not be appropriate for many real-life situations. Short items were, therefore, developed and these were shown to be correlated with the longer measures from which they were developed. The reliability and validity of the WPQ was established in surveys involving different occupational sectors. One key feature of the DRIVE model is the ability to add new predictors and outcomes. Studies have investigated variables such as ethnicity and culture, resilience, work-life-balance, psychological contract fulfilment and burnout. Other similar measuring instruments (e.g. the SWELL) have included questions about the physical working environment (e.g. noise exposure), working hours, presenteeism, absenteeism and musculoskeletal disorders.

One area that has not been addressed is whether impression biases influence scores on the WPQ. This was examined in the present study and it was found that lie scale scores were related to the reporting of negative outcomes. In contrast to this, lie scale scores did not predict positive outcomes or wellbeing scores based on the difference between positive and negative scores. This result shows the importance of including both positive and negative measures in the questionnaire and suggests that a short lie scale is included in future research on wellbeing at work.

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Appendix: The Survey

Wellbeing

1.I have been feeling in good spirits (for example: I feel optimistic about the future, feel good about myself and confident in my abilities)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

2. I have been feeling good about my relationships with others (for example: Getting along well with friends/colleagues, feeling loved by those close to me)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

3. I have been feeling in control of my mood (for example: feeling energetic and interested when I need to be, but able to relax when I want to)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

4. I feel that I do not have the time I need to get my work done (for example: I am under constant time pressure, interrupted in my work, or overwhelmed by responsibility or work demands)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

5, I am satisfied with my relationships at work (for example: I get the respect I deserve from colleagues, I am treated fairly, I receive support when I need it)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

6. I feel that I have been rewarded for my efforts (for example: The respect, role, and job prospects I receive are suitable for my efforts and achievements)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

7. I find it difficult to withdraw from my work obligations. (For example: work is always on my mind, I find it difficult to relax when I get home from work, people close to me say I sacrifice too much for my job).

1	2	3	4	5	6	7	8	9	10

Strongly Disagree Strongly Agree

8. I feel that my work is too demanding (for example: I have to work very fast, I have to work very hard, I have conflicting demands)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

9. I feel that I get adequate control over my work (for example: I have a choice in what I do or how I do things, I am able to learn new things, I am able to be creative)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

10. I feel that I am supported by my colleagues (for example: there is a good atmosphere at work, I get along with my colleagues, my colleagues understand me)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

11. I feel that I have been subjected to bullying in the workplace in the past 12 months (for example: unjustified criticism, verbal/non-verbal threats, violence, humiliation or exclusion)?

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

12. I feel that I am not consulted about changes at work (for example: There is no opportunity to question managers about change, I am unclear about how change will work out in practice).

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

13. I feel that I don't understand my role clearly (For example: I am not clear of what is expected of me and what tasks I need to perform)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

14. I feel that I get along well with my supervisor (For example: I know where I stand in terms of their opinion of me, my supervisor understands me, my supervisor recognises my potential)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

15. I feel that my supervisor supports me (For example: My supervisor helps me when I need it, my supervisor would use their power to help me)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

16. Thinking about myself and how I normally feel, in general, I mostly experience positive feelings (For example: I feel alert, inspired, determined, attentive)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

17. Thinking about myself and how I normally feel, in general, I mostly experience negative feelings (For example: I feel upset, hostile, ashamed, nervous)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

18. In general, I feel optimistic about the future (For example: I usually expect the best, I expect more good things to happen to me than bad, It's easy for me to relax)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

19. In general, I feel pessimistic about the future (For example: If something can go wrong for me it will, I hardly ever expect things to go my way, I rarely count on good things happening to me)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

20. I am confident in my ability to solve problems that I might face in life (For example: I can usually handle whatever comes my way, If I try hard enough I can overcome difficult problems, I can stick to my aims and accomplish my goals)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

21. Overall, I feel that I have positive self-esteem (For example: On the whole I am satisfied with myself, I am able to do things as well as most other people, I feel that I am a person of worth)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

22. Overall, I feel that I have low self-esteem (For example: At times, I feel that I am no good at all, at times I feel useless, I am inclined to feel that I am a failure)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

23. I feel that I have the social support I need (For example: There is someone who will listen to me when I need to talk, there is someone who will give me good advice, there is someone who shows me love and affection)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

24. I feel that I can provide the social support that others need (For example: There is someone who I listen to when they need to talk, there is someone who I can provide with help for their problems)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

25.When I find myself in stressful situations, I take a problem-focused approach (e.g. I take one step at a time, I change things about the situation or myself to deal with the issue, I don't let my feelings interfere too much).

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

26.When I find myself in stressful situations, I look for social support (e.g. I talk to someone to get more information, I ask someone for advice, I talk to someone about how I'm feeling).

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

27.When I find myself in stressful situations, I blame myself (e.g. I criticize or lecture myself, I realise I brought the problem on myself).

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

28. When I find myself in stressful situations, I wish for things to improve (e.g. I hope a miracle will happen, I wish I could change things about myself or circumstances, I daydream about a better situation).

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

29. When I find myself in stressful situations, I try to avoid the problem (e.g. I keep things to myself, I go on as if nothing has happened, I try to make myself feel better by eating/drinking/smoking).

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

36. I prefer to keep to myself (For example: I don't talk much to other people, I feel withdrawn, I prefer not to draw attention to myself

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

37. I feel that I have an agreeable nature (For example: I feel sympathy toward people in need, I like being kind to people,I'm co-operative)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

38. I feel that I have a disagreeable nature (For example: I can be rude, harsh, unsympathetic)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

39. I feel that I am a conscientious person (For example: I am always prepared, I make plans and stick to them, I pay attention to details)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

40. I feel that I am laid-back about things (For example: I do just enough to get by, I tend to not complete what I've started, I find it difficult to get down to work)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

41. I feel that I can get on well with others (For example: I'm usually relaxed around others, I tend not to get jealous, I accept people as they are)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

42. I don't really get on well with people (For example: I tend to get jealous of others, I tend to get touchy, I often get moody)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

43. I feel that I am open to new ideas (For example: I enjoy philosophical discussion, I like to be imaginative, I like to be creative)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

44. I am not interested in new ideas (For example: I tend to avoid philosophical discussions, I don't like to be creative, I don't try to come up with new perspectives on things)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

45. On a scale of one to ten, how happy would you say you are in general?

1	2	3	4	5	6	7	8	9	10

Extremely unhappy Extremely happy

46. On a scale of one to ten, how depressed would you say you are in general? (e.g. feeling 'down', no longer looking forward to things or enjoying things that you used to)

1	2	3	4	5	6	7	8	9	10

Not at all depressed Extremely depressed

47. On a scale of one to ten, how anxious would you say you are in general? (e.g. feeling tense or 'wound up', unable to relax, feelings of worry or panic)

1	2	3	4	5	6	7	8	9	10

Not at all anxious Extremely anxious

48. In general, how would you rate your physical health

1	2	3	4	5	6	7	8	9	10

Extremely poor Extremely good

49. Overall, how stressful is your life outside of work?

1	2	3	4	5	6	7	8	9	10

Not at all stressful Very Stressful

Hassles and Uplifts

Please take a moment to think about your daily life and your recent experiences (for example your daily tasks, your interactions with others, your thoughts about work or personal factors).

50. In the past week, how many of your experiences have been uplifting (i.e. made you feel happy or joyful, or gave a sense of satisfaction)?

1	2	3	4	5	6	7	8	9	10

None All

51. In the past week, how many of your experiences have been a hassle (i.e. irritated you, or made you upset or angry)?

1	2	3	4	5	6	7	8	9	10

None All

Stressful Life Events

52. How much is your rating of life stress above influenced by one or more specific stressful life events (e.g. a death in the family, separation, family or financial crisis)?

1	2	3	4	5	6	7	8	9	10

Not at all Very Much

53. Overall, how stressful do you find your job?

1	2	3	4	5	6	7	8	9	10

Not at all stressful Very Stressful

54. Overall, how satisfied are you with your current job?

1	2	3	4	5	6	7	8	9	10

Very Dissatisfied Very Satisfied

55. Overall, I feel that I am satisfied with my life (For example: In most ways my life is close to my ideal, so far I have gotten the important things I want in life)

1	2	3	4	5	6	7	8	9	10

Disagree strongly Agree strongly

Flourishing

56. I feel that I lead a purposeful and meaningful life (e.g. I am engaged and interested in my daily activities, I actively contribute to the happiness and well-being of others, I am a good person and live a good life).

1	2	3	4	5	6	7	8	9	10

Strongly Disagree Strongly Agree

Lie Scale

214. How often do you give a false impression of yourself?

Always Often Sometimes Rarely Never I'd rather not say

215. If you say you will do something, do you always keep your promise no matter how inconvenient it might be?

Yes No I'd rather not say

216. Were you ever greedy by helping yourself to more than your share of anything?

Yes No I'd rather not say

217. Have you ever blamed someone for doing something you knew was really your fault?
Yes No I'd rather not say

218. Are all of your habits good and desirable ones?
Yes No I'd rather not say

219. Have you ever taken anything that belonged to someone else?
Yes No I'd rather not say

220. Have you ever broken or lost something belonging to someone else?
Yes No I'd rather not say

221. Have you ever said anything bad or nasty about anyone?
Yes No I'd rather not say

222. As a child were you ever cheeky to your parents?
Yes No I'd rather not say

223. Have you ever cheated at a game?
Yes No I'd rather not say

224. Have you ever taken advantage of someone?
Yes No I'd rather not say

225. Do you always practice what you preach?
Yes No I'd rather not say

226. Do you sometimes put off until tomorrow what you ought to do today?
Yes No I'd rather not say

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Thyroid Abnormalities Profile of Children Aged 0-1 Years Through Biomarker Examination

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Abstract
Thyroid disorder is a non-communicable disease that has the potential to become a public health problem. One endocrinological abnormality that is often found in children is hypothyroidism, which is a condition due to reduced or no production of thyroid hormones. The aim is to evaluate the profile of thyroid abnormalities in children aged 0-1 years at RSAB Harapan Kita by reviewing the results of biomarker examination. Retrospective research design using secondary data at Harapan Kita Hospital Jakarta. The total of medical record was 157 data from January 2015-August 2016. Data analysis of TSH and fT4 biomarker examination results. Diagnosis of thyroid abnormalities can be done by stimulating thyroid hormone (TSH) biomarker examination, free thyroxine (fT4) which is useful as a biomarker for monitoring, detection, or therapy as early as possible in infants or children who are suspected or have experienced growth and development disorders. The study found 51% Euthyroidism, 23% subclinical hypothyroidism, 13% TSH mediated hyperthyroidism condition, 5% secondary hypothyroidism, 4% primary hypothyroidism, and 4% subclinical hyperthyroidism. From medical records, 20.4% were diagnosed with hypothyroidism, 12.7% developmental disorders, 20.1% down syndrome and 40.8% with a diagnosis of other diseases. The diagnosis of thyroid disorder, especially hypothyroidism, is found at 4-12 months of age as much as 22.8% and 8.9% at the age of 0-3 months. These results show that if management or follow-up of treatment and therapy in patients do not do early can cause permanent retardation of growth and mental development. One of the keys to the success of the treatment of children with thyroid disorders is by early detection through laboratory tests and treatment before children are one year old.

Keywords: Thyroid Abnormalities, Age 0-1 Years, fT4, TSH

1. Introduction

Hypothyroid prevalence in Indonesia is not known with certainty. Results of Basic Health Research (Riskesdas) 2007 found 2.7% of men and 2.2% of women had high TSH levels that showed suspicion of hypothyroidism (Pusdatin Ministry of Health: 2015). The results of Wibowo's research, A: 2013 on 398 school-age children with different levels of endocrine deficiency of iodine found high TSH levels as much as 9% and low fT4 1.8%. Research conducted by Purwanti, KD: 2008 on early detection of congenital hypothyroidism with Neonatal TSH and neonatal fT4 examination in West Nusa Tenggara against 100 samples of umbilical cord blood spots showed a prevalence of 1: 2,500-4,000 in the areas of West Lombok and East Lombok as moderate to heavy endemic areas. Based on the results of congenital hypothyroid screening (SHK) from 2000– 2014 in several selected locations in Indonesia, positive cases were found in the proportion of 0.4 per 1,000 of newborns (Public Health Ministry of the Ministry of Health: 2015).

Indonesia has not had data of congenital hypothyroidism cases nationally. Congenital hypothyroid data in Indonesia can only be obtained from RSUP Dr. CiptoMangunkusumo Jakarta and Hasan Sadikin Hospital Bandung. The medical record review at these Hospitals endocrine pediatric clinics in 2012-2013 showed that more than 70% of congenital hypothyroid patients were diagnosed after 1 year of age so that they had permanent mental retardation. Only 2.3% can be recognized before the 3 months of age and treatment can minimize the retardation of growth and development (Ministry of Health, 2014: 8; Pusdatin Ministry of Health: 2015). Some of these cases were diagnosed late so that they had impaired growth and motor development and intellectual impairment.

Diagnosis of thyroid disease can be done by examining thyroid stimulating hormone (TSH), free thyroxine (fT4), T3 and T4, as monitoring, detection, or therapy as early as possible in infants or children who are suspected or have experienced growth and development disorders Symptoms in hypothyroid patients are usually not very clear, therefore TSH, T4, and fT4 examinations are needed (Stockigt, J, 2003). Errors in diagnosing hypothyroidism can result in a variety of undesirable effects by thyroid hormone therapy, while basic illnesses are actually undiagnosed (Purnamasari, 2007). Estimates of sensitive fT4 and TSH can be used for diagnosis of thyroid disease and to follow up on patients that receive T4 replacement or anti-thyroid drug therapy (Susanto, R, 2009)

2. Method

The study used a retrospective design using secondary data. A total of 157 data that met the inclusion criteria were records of laboratory examination results of biomarkers of thyroid function based on clinical diagnosis and follow-up of neonatal screening tests and medical records for children aged 0-1 year at Harapan Kita Hospital in January 2015 - August 2016. This amount is more than the expected sample size (minimum 92 samples). The data obtained in the study were analyzed descriptively and correlated.

TSH and fT4 test

The Enzyme *Linked FluoresenceImmuno Assay* (ELFA) technique was used for TSH and fT4 examination with Immuno Analyzer (VIDAS). Calibration, using the calibrator provided in the kit and performed every time opening a new reagent after the lot master data has been entered in the tool. Calibration must be done every 14 days. The calibration curve results for the instrument and compensates for possible minor variations in the test signal during the kit's storage period. The calibrator, which was identified, tested in duplo. The calibrator value must be in the RFV "Relative Fluorescence Value" range. The sensitivity and specificity of VIDAS® TSH and fT4 are 100%.

This study has received approval from the Ethics Commission for Health Research at the Health Ministry of Health Polytechnic Jakarta III No. 068/KEPK-PKKJ3/05/2016 before the data collection, informed consent was previously submitted to the Hospital and the data obtained would be kept confidential by not discussing it out of the research team. Descriptive data and test based on time, gender, TSH and fT4 levels.

3. Results

The mean result of basic laboratory examination of thyroid function was TSH, fT4 in children 0-1 years in Harapan Kita Hospital, as in Table 1

Table 1. Average Value of TSH Levels, fT4 by Age

Variable	Mean and Standard Intersection (X ±SD)		
	0-3 months	4-12 months	Referral Value*
TSH (uIU/mL)	8.83 ± 13.16	5.79 ± 9.79	0.27-4.70
fT4 (pmol/L)	18.11 ± 5.18	16.25 ± 5.80	10.60-19.40

** Normal reference values based on VIDAS® TSH dan fT4

Thyroid Stimulating Hormone (TSH) functions to stimulate the production of thyroid hormones T4 and T3 through their receptors on the surface of the thyroid cell. If T3 and T4 levels increase, TSH production will be suppressed so that there will be a decrease in T3 and T4 levels. Triiodothyronine (T3) is a thyroid hormone in the blood with small levels, has a shorter work than T4. Thyroxine (T4) in the bloodstream can form free T4 and bound to protein.

In this study, 157 respondents conducted TSH and fT4 checks at the same time. There were only a few respondents that carried out T3 and T4 together with TSH and fT4, so that researcher could not meet the number of samples. Based on this idea, then in this study researcher only convey the results of TSH and fT4 examination for children aged 0-1 years.

Characteristics of respondents based on age, gender, and clinical diagnosis found the number of children aged 0-3 months as much as 27.4% and ages 4-12 months 72.6% (Table 2). When referring to Permenkes RI No.78 of 2014 concerning Congenital Hypothyroid Screening (SHK), screening examinations are used to sort infants HK suffers from babies who are not HK sufferers at the age of 48-72 hours. It aims to detect as early as possible the presence of congenital disorders. Laboratory testing and treatment before a child reaches 1 month old is the key to successful treatment of children with HK. The lack of number examinations in children 0-3 months is likely because Harapan Kita Hospital is a National Referral Hospital which in the era of BPJS, the treatment is started from primary services so that patients who are treated at RSAB Harapan Kita are referrals patients from various regions.

Table 2. Characteristics of subjects based on time, sex and clinical diagnosis

Characteristics	N	%
Usia		
0 - 3 months	43	27.4
4 - 12 months	114	72.6
Gender 0-3 months		
Male	29	18.5
Female	14	8.9
Gender 4-12 months		
Male	71	45.2
Female	43	27.4
Clinical Diagnosis		
Hypothyroidism	32	20.4
Developmental Disorders	20	12.7
Down syndrome	41	26.1
Other diseases	64	40.8

Clinical diagnosis of requests for examination of TSH and fT4, three are mostly due to hypothyroidism (20.4%), *Down syndrome* (26.1%), developmental delay (12.7%) and due to other causes (40.8%).

Table 3. Frequency distribution of interpretation of biomarker results based on age and approach to thyroid abnormalities based on interpretation of examination results of TSH and fT4 levels with n = 157

Variable	Age 0-3 months				Age 4-12 months			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
Eutiroid	12	7.6	7	4.4	36	22.9	25	15.9

Hypothyroid	3	1.9	0	0	3	1.9	0	0
Subclinical Hypothyroidism	7	4.5	4	2.5	13	8.3	12	7.6
Secondary Hypothyroidism	0	0	0	0	4	2.5	4	2.5
Subclinical Hyperthyroidism	0	0	2	1.3	5	3.2	0	0
Hyperthyroidism mediated by TSH	8	5.1	0	0	11	7.0	1	0.6

(Data Source: RSAB Harapan Kita Jakarta, January 2015-Agustus 2016)

Description: Eutiroid: normal TSH, normal fT4; Hypothyroidism: high TSH, low fT4; Subclinical hypothyroidism: high TSH, normal fT4; Secondary hypothyroidism: normal TSH, low fT4; Subclinical hyperthyroidism: low TSH, normal fT4, TSH-mediated hyperthyroidism: high fT4 with high TSH

Table 4. Correlation levels of Pearson test results on the relationship between TSH and fT4 levels by age

Variable	0-3 months	4-12 months	p value (sig (2-tailed)
TSH dan fT4 levels	-.344*	-.264**	
TSH levels and gender	-.216	-.128	.001
T4 levels and gender	-.307*	-.124	

Pearson test, * level of correlation was significant at α 0.05; ** level of correlation is significant at α 0.01
The results of the bivariate analysis illustrate a significant relationship with negative patterns between TSH and fT4 when related to age and sex. The result of the correlation coefficient is medium.

4. Discussion

In the Guidelines of the American Thyroid Association, it was stated that the selection of appropriate laboratory tests would allow diagnosis of thyroid abnormalities in many patients. The first line test that can be selected is TSH, because TSH is a sensitive indicator of thyroid abnormalities. Enhancement of thyroid hormone causes negative feedback on the pituitary gland so that TSH levels decrease, vice versa. TSH examination only cannot be used if abnormalities occur at the level of the pituitary gland. So we need another thyroid examination. The next option is an fT4 examination, and then if it is necessary should be added with the total of T3 examination. In general, all three of these examinations are requested at once, but because the price is quite expensive at this time the determination of free thyroxine (free T4 / fT4) and TSH as a basic examination of the diagnosis of thyroid function abnormalities (Laboratory Corporation of America, 2014; Dwi, Ratna S. 2014)

Thyroid hormone testing including immunological examinations is quite often requested by the clinician but it is not a routine checkup and only requested if there is a suspicion of thyroid abnormalities. Interpretation of the results of laboratory examination of thyroid function is done through understanding pathophysiology, history of illness from a suspected disorder. Not all thyroid abnormalities show abnormalities in thyroid function, and there are also asymptomatic in hyperthyroidism and subclinical hypothyroidism. The results of the analysis of thyroid hormones can help in diagnosis (Martin I, Surks, et al., 2004).

Decreased fT4 levels and increased TSH levels in 4% of respondents indicated primary hypothyroidism. Abnormalities occur in the thyroid gland, both anatomically and physiologically. If normal fT4 and increase of TSH levels are obtained in the age of the neonates, this abnormality condition is caused by congenital hypothyroidism, but it can also because a normal variant found in 23% of respondents that is called subclinical hypothyroidism. Congenital hypothyroidism suspicion increases when TSH levels> 40 uIU / mL are obtained. Respondents with TSH levels of 20-40 uIU / mL are still necessary to re-examine to confirm the results.

In 5% of respondents experienced a decrease in fT4 accompanied by a decrease in TSH levels. The diagnosis for this condition is secondary hypothyroidism or central. Abnormalities occur in the location of the central nervous system (pituitary or hypothalamus). To distinguish whether the pathology is located in the hypothalamus or pituitary can be examined thyroid releasing hormone (TRH) levels. Central hypothyroidism is often followed by other pituitary hormone disorders such as growth hormone, cortisol, gonadotropins. In central hypothyroid disorders, further investigation is needed to look for pituitary hormone abnormalities above. Symptoms such as growth disorders, palstokiziz and central nervous system problems need to be known to help diagnosis. Some things can cause normal fT4 levels followed by decreased TSH levels. This condition is called subclinical hyperthyroidism which may be due to side effects of drugs and normal variants. Some drugs can cause side effects suppressing TSH secretion. A very small decrease in TSH needs to be watched as a normal variant (Schteingart, David E. 2006).

According to Batubara (2005, 2010), hypothyroid cases are more commonly found in girls than boys with a ratio of 2: 1. In this study, in contrast to the results of previous studies, there were 63.7% male and 36.3% female who were spread with several thyroid abnormalities as shown in Figure 2. This shows the possibility that RSAB Harapan Kita is a referral hospital. So, the number of boys does not describe the ratio as delivered by Batubara: 2010. Women's risk is higher than boy's, and this is because girls have two allelic copies with two X chromosomes while boys only have one allele copy with one X chromosome. Therefore the risk of hypothyroidism is higher in girls.

At the age range of 4-12 months, the results were not different from the age of 0-3 months, and namely male are more than females (Kapelari K et al., 2008). According to the Ministry of Health (2014), more than 70% of patients with thyroid disorders and more because of hypothyroidism was diagnosed after 1 year of age so that they have permanent mental retardation (Hashemipour M et al., 2009). From the results of this study, the diagnosis of hypothyroidism is mostly found in the age of 0-3 months, and this shows that management or follow-up of treatment or therapy for hypothyroid patients can be done early so can minimize growth retardation and permanent mental development. The key to the success of treatment of children with hypothyroidism is by early detection through laboratory tests and treatment before the child is 1 year old. Thus early detection in preventing the occurrence of treatment delays is important, if it does not immediately detect or treated the children will run into an overall physical growth disruption and mental development retardation that cannot be restored, because permanent hypothyroidism requires lifelong treatment and special treatment (Ministry of Health, 2014, Cebeci, A.N et al., 2013).

5. Conclusion

One of the keys to the success of treatment of children with thyroid disorders is by early detection through laboratory tests and treatment before the child is 1 year old. To be more meaningful, it is expected that further research can be carried out in a primary way to obtain examination results from biomarkers of thyroid function over T3 and T4 so that the profile of thyroid abnormalities can be established.

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Challenges Affecting Sustainability of National Sanitation Day (NSD) Programme in Ghana

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Abstract
The National Sanitation Day (NSD) programme was initiated by the Ghanaian government in 2014 through the Ministry of Local Government and Rural Development as a way of addressing the poor environmental conditions in Ghana. This was as a result of a cholera outbreak which took over 200 lives in the same year. Although well intended, the programme faces several sustainability challenges. Therefore, the purpose of this study is to examine the main challenges facing the NSD programme. The paper bases on newspapers and key informant information and identifies four shortcomings which undermine the initiative's effectiveness, namely, lack of adequate logistical services, politicisation, insufficient enforcement of by-laws and poor publicity. Against the backdrop of these findings, suggestions are made on the trajectory of sustainability.

Keywords: National Sanitation Day, Poor Waste Management, Sustainability, Ghana

1. INTRODUCTION

Proper management of solid waste remains a severe problem across the world. This is especially observed in developing countries, and Ghana is no exception (Kocasoy, 2000). Besides increasing population, improved lifestyle and habit of people have precipitated an increase in the quantity of solid waste generated in both rural and urban areas of the world (Agarwal, Chaudhary, & Singh, 2015). Kocasoy (2000) claimed that the production and consumption of new products, industrialisation, and rising disposal income are jointly generating increasingly inordinate quantities of solid waste. This, in turn, is creating numerous problems regarding their proper collection and disposal. Currently, world cities generate nearly 1.3 billion tons of solid waste annually. This volume of waste is expected to surge to 2.2 billion tons by the end of 2025. The rate of waste generation will double over the next two decades, especially in developing countries. Globally, the annual cost of solid waste management will rise from today's $205.4 billion to approximately $375.5 billion in 2025. The cost increase will be most severe in developing countries (Hoornweg & Bhada-Tata, 2012). Human activities generate waste, and the means by which this waste is managed can pose risks to the environment and to public health. In urban areas in developing economies, issues and problems of municipal waste management are of immediate importance (Zurbrugg, 2003). This has been recognised by most governments, but growing populations are affecting the ability of most local governments to provide even basic services. Usually, one-third to two-thirds of the solid waste produced is not collected.

Scores of municipalities in the least developed and developing economies spend about 30 to 50 percent of their constrained budget on municipal solid waste management. However, they manage to collect only approximately

30 to 60 percent of the solid waste, leaving more than 50 percent of the urban population unserved (Onibokun, 1999). As a result, the uncollected solid waste, which is occasionally mixed with excreta, is dumped anywhere, such as streets and other public places, thereby posing serious environmental hazards (Amoah, 2014). In the city of Rawalpindi, Pakistan, for example, 30 to 50 percent of uncollected waste remains on the roadsides and other open spaces, spreading infectious diseases (Ejaz, Akhtar, Hashmi, & Naeem, 2010). According to Hoornweg and Bhada-Tata (2012), uncollected solid waste, more often than not, is the leading contributor to flooding and air pollution. Sam Jr. (2002) argued that water pollution is another important potential consequence of inadequate waste management. Unregulated waste leachate near watercourses exposes city dwellers to the risk of urban flooding and increases the technical difficulties of providing clean water. Flooding occurs when drainage systems and other storm-control devices overflow caused by blockages of waterways. Diseases due to poor management of waste, including malaria, dysentery, and cholera, can cause illness and death. "Solid waste management is almost always the responsibility of local governments and is often their single largest budget item, especially in developing countries" (Hoornweg & Bhada-Tata, 2012). Studies have extensively shown the failure of poor local governments in developing countries to ably plan and handle municipal solid waste (Okpara, 1999).

Ghana is a country located in the West Africa sub-region. It has a total area of 238,533 km^2 and is thus almost the same size as Great Britain. Ghana lies between 4 and 12 degrees north latitude and 4 degrees west and 2 degrees east longitude. It shares borders with Cote d' I voire to the west, Burkina Faso to the north, Togo to the east and Gulf of Guinea and the Atlantic Ocean to the south. Agriculture is the main stay of the country's economy (Abalo, Peprah, Nyonyo, Ampomah-Sarpong, & Agyemang-Duah, 2018). The projected population of the Ghanaian economy for 2018 is approximately 29,614,337, with an annual growth rate of 2.39 percent. However, this growing population does not happen alone. It is accompanied by the generation of large quantities of solid waste, which stems from the changing consumption habits of the population and the changing structure of Ghana's economy. Together, these factors facilitate the production of different kinds of waste, particularly municipal solid waste (Abalo *et al.,* 2018).

Ghana, as a developing country, encounters difficulties in managing waste extending from the state to the local government, and refuse of different shapes and sizes is a common sight in rural and urban areas. These difficulties are concentrated and made more difficult by population pressure (Thompson, 2010). The amount of waste produced is far greater than the volume collected. Solid waste collection services are inadequate for covering most of the country's cities (Boadi & Kuitunen, 2003). In Wa, Ghana, approximately 810 tons of solid waste is produced per day, of which only 216 tons are collected. This leaves 594 tons uncollected and seriously threatening the environment and public health (Amoah & Kosoe, 2014). In the same vein, 2,800 metric tons of municipal solid waste is generated daily in Ghana's capital, Accra. Out of this amount, about 2,200 tons are collected, leaving a backlog of 600 tons accumulating in water bodies and open drains and causing flooding during the rainy season (Badoe, 2014). In 2014, Ghana recorded approximately 28,922 cholera cases with around 247 deaths resulting from the country's poor waste management. According to a report from the Ministry of Health (2014), this figure was the largest number of cholera cases recorded in the last 30 years. This situation threw the entire nation into a state of shock and impelled the government to create a programme (or establish a special day) for involving the citizens in keeping the country's environment clean, hence the name "National Sanitation Day (NSD)."

There is an overwhelming amount of literature on the sanitation in Ghana. Much of this research is based on factors causing poor sanitation or impacts of poor waste and sanitation management. However, studies that specifically focus on the NSD programme are rare. A review of the literature suggests that some successes have been achieved due to the introduction of the NSD programme, but the initiative remains marred by several sustainability challenges. The current research looks into the concerns that affect the NSD programme and proposes measures that could given full consideration, sustain it. Specifically, the study clarifies the concept of solid waste, municipal solid waste, and solid waste management. It explains the NSD programme and sustainability in sanitation programmes. This is followed by a discussion of the methods adopted for collecting data. Finally, this work identifies and analyses NSD programme challenges and offers recommendations for sustainability where necessary.

2. LITERATURE REVIEW

2.1. Solid Waste, Municipal Solid Waste, and Solid Waste Management: Conceptual Clarification

Solid waste is any material that is not available in liquid form and has no value to the person responsible for it. Although human or animal excrement is often found in solid waste streams, the term "solid waste" generally does not include these materials. Synonyms for solid waste are such terms as "garbage," "trash," "refuse" and "rubbish" (Zurbrugg, 2003). On the other hand, municipal solid waste is defined as solid waste from homes, streets and public places, shops, offices, and hospitals, which often fall under the jurisdiction of municipalities or other public authorities. Solid waste emanating from industrial processes are generally not considered "municipal" waste but must be considered in solid waste treatment, as they often enter the stream of municipal solid waste. Finally, solid waste management encompasses all activities aimed at minimising the impact of solid waste on health, the environment and aesthetics (Zurbrugg, 2003). This includes activities related to cleaning and maintaining household compounds, neighbourhoods, streets and public places (Park, 2011).

2.2. Overview of National Sanitation Day Programme

Solid waste management is an important aspect of sustainable development for each country, and global initiatives support priority setting for solid waste management. Global efforts of maintaining environmental quality are linked to sustainable development and are now being proposed by governments and international organisations (United Nations Development Programme, 2007). A clean environment and effective waste management systems, for example, are among the United Nations Sustainable Development Goals (SDGs). The SDGs indirectly support the sustainable management of solid waste within the framework of environmental sustainability objective six. The aim is to promote the integration of sustainable development principles into the development policies and programmes of each country (United Nations Development Programme, 2007). In September 2010, a revised Environmental Sanitation Policy was produced for Ghana. The overall goal of this new policy is to develop a clean and nationally accepted vision of environmental sanitation as an essential social service and a major determinant for improving the health and quality of life in the country. The policy is a necessary tool required for helping shape all efforts in dealing with the overwhelming challenges of poor sanitation in the country (Yeboah, 2015). Consistent with initiatives in Cameroon, Nigeria, Sierra Leone and Liberia that aim to involve citizen volunteers in the cleaning of communities, homes, and streets, the NSD was introduced by Ghana (Monney, 2015).

The NSD is an initiative launched by the Ministry of Local Government and Rural Development (MLGRD) in the last quarter of 2014 for implementing clean-up exercises across the country in order to deal with the cholera outbreaks in Ghana (Myjoyonline, 2016).

In June 2014, an outbreak of cholera was reported in Ghana. On 18 August, 6,018 cases were reported, including 47 deaths (0.9 percent fatality rate) in 34 districts in five regions. The most affected region was the Accra Metropolitan Area, where 5,558 cases and 45 deaths were recorded. As the number of cases increased, Ghana Health Service turned to the Red Cross for help (Relief Web, 2014). By early September, the number of cases had exceeded 15,000, of which 126 were fatal. By 19 October, a total of 23,622 cases had been reported, 190 of which were fatal. The disease affected all 10 regions of Ghana (Relief Web, 2014), namely, Greater Accra, Ashanti, Brong-Ahafo, Upper West, Northern, Volta, Upper East, Eastern, Central and Western regions. The metropolitan area of Accra was the most affected, with 75 percent of cases and 60 percent of deaths (Relief Web, 2014). By the end of 2014, 28,922 cases with 247 deaths had been reported (Badoe, 2003) from 130 out of the 216 districts in all 10 regions of Ghana (Myjoyonline, 2016). Table 1 indicates the reported cholera cases and deaths in Ghana between 2010 and 2016.

In an attempt to limit the unhealthy conditions which cause diseases and other factors that lead to injuries, the government reserves the first Saturday of each month for clean-up exercises all over the country for all Ghanaians (News Ghana, 2016). The programme is part of efforts designed to encourage Ghanaians to clean their environment. The aim is to make the citizens aware of the need to keep their environment clean and tidy (Ghana News Agency, 2017). Most business activities on the day of the programme remain closed for several hours to allow people to participate in environmental cleaning activities actively. According to mayors, the programme is part of the civic responsibility of community members to clean up the environment in order to

make it safe and thus promote health (Ghana News Agency, 2017). The programme has attracted high profile personalities in the country, such as the president, vice-president, ministers of state, members of parliament, district chief executives, Otumfuo Osei Tutu II (head of the Asante kingdom), Ghana Police Service, the Ghana army and Ghana Immigration Service. All these individuals have participated in clearing garbage in some parts of the country to promote environmental cleanliness following the programme inception.

The NSD programme is intended to eliminate heaps of garbage at all refuse to dump places across the country, particularly in cities, and more importantly, to educate the public about the separation of paper, plastic and liquid waste (News Ghana, 2016). From the programme's inception until 2015, 10 major clean-up exercises were performed in all regions of the country (Gyasi, 2016). Meanwhile, a bill is currently in Ghana's parliament for approval; this bill will give legal backing to the programme and make individuals who refuse to take part in NSD activities subject to prosecution (News Ghana, 2016). According to the Deputy Minister of Local Government and Rural Development Nii Lante Vanderpuije, this has become necessary for arousing the interest of the public in participating in the programme.

Table 1: Cholera cases and deaths in Ghana in 2010-2016

Year	No. of Cases	No. of Deaths
2010	*9,542*	100
2011	*10,628*	105
2014	*28,922*	247
2015	*962*	10
2016	*720*	No deaths

Source: (Ministry of Health, 2014; Relief Web, 2017; Gyasi, 2016; Modern Ghana, 2017; Starrfmonline, 2016)

2.3. Sustainability in Sanitation Programmes

Improving health and protecting the environment are the objectives of water and sanitation programmes in developing countries. Such programmes enable communities to live healthier lives by improving their conditions and access to a clean environment (Ademiluyi & Odugbesan, 2008). The Overseas Development Institute describes the sustainability of water and sanitation programmes as an important concern in developing countries (ibid). Sustainability implies "the capacity of a project to continue to deliver its intended benefits over the long term" (Katz & Sara, 1997). There is no time limit set for such continued services or projects (WaterAid, 2011). Appropriate strategies for community-based water and sanitation programmes in developing countries must be based on a clear understanding of existing problems and determinants of sustainability (Carter, Tyrrel, & Howsam, 1999). In developing countries, sizable numbers of projects, including those in water supply and sanitation, fail to deliver long-term benefits to society (Antonio, 2005). One of the reasons for this failure is the lack of understanding of impacts and sustainability issues. From the point of view of Olajuyigbe (2016) and Abtahi *et al.* (2017), the lack of sustainability of water and sanitation programmes results from poor public awareness, including investments in equipment. Lumbreras and Fernández (2014) postulated that the need to improve public awareness had been widely recognised by researchers as necessary for achieving sustainability and promoting environmental citizenship among populations. A functioning programme requires a number of governance, social, financial, institutional and technical issues to be addressed. Sustainability in the sense of continuous provision and use of services is threatened by several attitudinal, economic and institutional factors, and approaches to citizen participation alone are not a guarantee of success (Carter *et al.,* 1999). The key to sustainability is that all stakeholders involved need to support and perceive the programme in their best interests to deliver high-quality services. Worku and Muchie (2012) identified some methods that cities around the world have employed. These include enforcement of sanitary regulations, promotion of education about good waste management among community members and good governance.

3. METHODOLOGY

A pure qualitative approach was adopted for achieving the research goals. Data was sourced from newspapers published by media outlets. The media houses included The Ghanaian Times, The Chronicle, Ghana News Agency, News Ghana, The Graphic, Myjoyonline, Citifmonline, Starrfmonline, Ghana Business News and so

on. The newspapers contained interviews conducted by reporters of the aforementioned media organisations with citizens/community members, the staff of waste management company (Zoomlion Ghana Limited) and so forth regarding their views and opinions with respect to the NSD. Reporters are stationed at various communities, including public places, to give a vivid description of events taking place. The newspapers also contained speeches of the Local Government and Rural Development Minister, the Deputy Minister of Local Government and Rural Development and district chief executives. Moreover, the study used interviews with key informants (experts who have knowledge of a particular field) within civil society organisations who advocate environmental sustainability and perform activities related to sanitation. Purposive sampling was used for selecting the informants because the researchers believed that the study needed individuals who are well experienced and have information within the sphere of environmental sanitation. Five informants were interviewed, and their interviews were deemed the primary source of data by the researchers. Finally, the data collected was carefully analysed and augmented with secondary sources obtained from a review of the literature. In a nutshell, the specific aim of the paper was to combine these sources (newspaper articles and other commentaries) in a publishable form to highlight the challenges bedevilling the NSD programme and then offer recommendations where necessary towards sustainability, given the lack of thorough academic study on this issue.

4. ANALYSING NSD PROGRAMME CHALLENGES IN GHANA

The following were identified during the newspaper review and key informant interviews as some of the challenges facing the NSD programme. These cover logistical challenges, politicisation, inferior publicity and poor enforcement of by-laws.

4.1. *Inadequate Logistics* - Olajuyigbe (2016), Bortoleto and Hanaki (2007) and Abtahi *et al.* (2017) underscored the importance of the availability of adequate logistical services towards the sustainability of sanitation programmes. Interviews with key informants emphasised the usefulness of waste container bins, wheelbarrows, and shovels for the clearing of choked drains coupled with refuse collection. The absence of such facilities and related tools presents dire consequences for sanitation management programmes (in this context, NSD) and slows down citizens' participation in garbage collection, disposal, and segregation. *"You cannot make any meaningful progress of the NSD programme without the required tools. They are very instrumental in the collection and disposal of garbage and even segregation. This could keep the programme running"*. People are considering participating in the activities only to realise that there are no tools for mass collection and disposal of waste (Myjoyonline, 2016). In some places in the regional capital Accra, piles of garbage are commonly seen even on the day of the programme. Some residents complain about the fact that waste is being left on the sides of streets uncollected when they clean the gutters, thereby causing the waste to eventually be placed back in the gutters (Effah, 2016). Therefore, there is no apparent incentive to further participating in this clean-up exercise. Ghanaian Times, a national newspaper, reported that some youth clubs in the country, before actively participating in the programme, have appealed to authorities responsible for waste management to provide containers for waste collection (Ghanaian Times, 2014). Lack of adequate facilities for disposing of collected refuse in communities, streets, and other public places have caused people to behave negatively towards the programme. *"A programme like this kind you need a staggering number of containers to encourage more participation. Without such facilities, participation could definitely go down and adversely impact on the programme"*. Studies have reiterated the point that waste that remains unattended scatter and block drains, leading to flooding. This probably explains the constant flooding in the cities of Ghana (Ghana Web, 2016). On 3 June 2015, for example, 154 people lost their lives in devastating floods in Accra. One of the causes of this catastrophe was the poor management of waste, which manifested in the form of blocked gutters. According to Samwine *et al.* (2017), the provision of solid waste collection facilities is the responsibility of the central government. In developing countries, including Ghana, efforts focus primarily on collection and disposal, but no facilities are provided (Manga, Forton, and Read, 2008; Samwine *et al.,* 2017). This form of management is due to poor governance (Manga *et al.,* 2008; Kazungu, 2010; Thompson, 2010).

4.2. *Politicisations* - Given the laudable nature of the NSD programme rolled out by then-President John Dramani Mahama to protect the country from being riddled by diseases and embarrassments among the international community, and it has been politicised. According to Communication Manager of Zoomlion, a

waste management company in Ghana, the NSD has been politicised to the extent that people refuse to participate in the programme if they perceive the assembly member or the member of parliament of a particular area where the exercise is being held to belong to an opposing political party (Yagbon, 2016). Cronies of opposing political parties refuse to actively participate lest their excellent work is attributed to the ruling party and thus enhance the latter's chances in subsequent elections. Furthermore, political parties, in particular, the main opposition and their followers saw the NSD programme as a platform used by the ruling party to galvanise political support in the forthcoming election. The programme is also perceived by the main opposition party as a platform employed by the ruling party for projecting its image and that of the president, the vice president or any other person within the ruling party who could become presidential candidates in the eyes of the public. The opposition party once regarded the programme as room for the ruling party that brought the initiative to engage in wanton dissipation of public funds. The reason for this is that the government has not been able to disclose an exact amount of money earmarked for the NSD. Conversely, supporters of the ruling party in certain parts of the country have not spared the programme from wearing party T-shirts and scarfs on the day of the programme. This could not be disputable since the goal of political parties is to seize political power. This needless politicisation could, in turn, have serious social and economic implications.

"We have politicized everything in this country. A programme that was supposed to register a huge number of citizens is being reduced to politics. Participation has gone down as you can see because they all want power. The main opposition party among the many political parties have raised several red flags about the NSD programme. 'They have raised issues of transparency and accountability, marketing of presidential candidate, and all that. As I just indicated, all of them are interested in the next election otherwise why would you be wearing T-shirts with the picture of the current president (ruling party) *on the programme day. This programme could die out soon if this is how we continue to handle it".*

This study finding is supported by that of Ishola (2018), a research study in the Oyo state of Nigeria. He asserted that the effectiveness and efficiency of efforts of the solid waste management sector are crippled and plagued by unnecessary partisan politicisation, which negatively impacts the solid waste management by stakeholders, especially by states' local governments.

4.3. *Inadequate Public Awareness* - Lack of adequate information for creating public awareness has a detrimental impact on programmes aimed at addressing waste management conundrums. By implementing such a programme on the path to sustainability, Abtahi *et al.* (2017) advocated the use of the media for raising awareness to encourage citizen participation in cleaning the environment. In corroborating this viewpoint, campaigns for raising awareness at a particular location and in a country concerned can bring about change and have a positive impact on waste management-related programmes (Zhu, Asnani, Zurbrugg, Anapolsky, & Mani, 2007). This would reduce the volume of solid waste within communities, streets, and public places. In the case of the NSD programme, however, the story is quite different. Increasing public awareness, as a means of changing the behaviour of people to ensure environmental hygiene, is largely neglected by authorities (Monney, 2015). The failure of some residents to participate in the clean-up exercise is due to the poor level of public education provided for sensitising the public. Others contend that the clean-up exercise is the responsibility of the waste management organisation Zoomlion Ghana, which is paid for the implementation of this task (The Graphic, 2016). In some local areas, residents forget about the exercise and attribute it to the low level of sensitisation and awareness (Yagbon, 2016). Our interactions with the informants revealed that the collaboration between the MLGRD; metropolitan, municipal and district assemblies (MMDAs), the media and traditional authorities, among others, is weak in helping create awareness and proper waste management for the public to participate in the exercise. In the view of Mmereki (2016), it is not easy to maintain a successful programme without effective collaboration between interested parties, such as radio, television and religious leaders. *"We have very good programmes in this country and National Sanitation Day is among one of them. The success of a programme depends on cooperation with the media and other stakeholders to inform the public. In the case of our programme, the National Sanitation Day, such cooperation is very poor"*. According to Monney (2015), in Ghana, education on sanitation and hygiene on electronic media generally only happens when there are cases of

disease outbreaks. He further added that after outbreak cases, the airwaves are used for the usual "political tae kwon do[1]".

4.4. *Poor enforcement of sanitation by-laws* – The poor patronage recorded for the NSD programme reflects the inability of the MMDAs to enact and implement by-laws that would reduce the low patronage witnessed over some periods during the exercise (The Graphic, 2016). Speaking in an interview with Ghana News Agency, some police superintendents explained that the lack of laws that prosecute offenders who do not honour the NSD contributes to low turnout (Modern Ghana, 2016). Additionally, Ghana Business News (2018), in an interview with Julius Debra, Minister of MLGRD, explained that 'most of the prescribed punishment in the laws are nothing to write home about. They are very old, and the fines are very minimal, and so we have to do something that will be punitive enough to reflect the current circumstances'. The cleanliness of a country's environment should be the main concern of all. Nevertheless, Ghana's by-laws on sanitation appear lenient (The Chronicle, 2014). Supporting this opinion, Yeboah (2015) argued that the current legislation on environmental sanitation in Ghana is superfluous, as no measures have been taken against culprits for years. In countries such as the United States of America and Sweden, the strict application of sanitary by-laws helps solve the major waste problems in cities (Caplan, Grijalva, & Jakus, 2002). This can equally be replicated in Ghana as far as the sanitation programme is concerned, but delays in the release of the District Assembly Common Fund (DACF) by the central government, aside from the inability of the MMDAs to generate adequate revenue at the local level, are preventing them from fully implementing municipal by-laws. *"Metropolitan, Municipal and District Assemblies (MMDAs) in addition to their local revenues get support from the government to undertake their activities, but the difficulty here is that government delays in releasing these MMDAs common funds*."

5. CONCLUSION AND RECOMMENDATIONS

The study analysed the NSD programme of Ghana, where sanitation is a serious problem. It can be argued from the statistics presented in Table 1 that the NSD programme is a good initiative and must be pursued until sanitation-related diseases, such as cholera, and other problems caused by poor sanitation are a thing of the past. The programme nonetheless is characterised by many challenges. According to the analysis, these challenges include inadequate logistics, politicisation, inferior publicity and poor enforcement of by-laws. These contribute to increasing public apathy, which makes achieving programme sustainability difficult. Addressing one of the identified challenges without solving the others can still undermine the success story of the NSD programme. It is therefore essential to take into account and address all challenges. Against this backdrop, the following recommendations for sustaining the programme are proposed.

- The government should ensure an adequate supply of waste receptacles in order to ensure proper management of waste and thus effectively sustain the programme. This will increase citizen participation and speed up in the clearing of clogged drains and collection of refuse on the streets, among others.
- Politicians should delink the NSD programme, which aims to prevent environmental hazards and protect Ghanaians from diseases, from purely party-political lenses and recognise it as a national development programme. They should also hold serious talks with their supporters and make it clear to them that the programme has no connection with one's political leanings.
- The MLGRD and MMDAs should collaborate effectively with media organisations to raise public awareness about the consequences of poor environmental quality and the need for their active involvement. In addition, they should request religious leaders to use their pulpits to disseminate information and raise awareness. The MLGRD and MMDAs should do the same for traditional leaders, as they have clout and command high respect in society. Their offices could be a source for propagating information to their followers under their respective jurisdictions. This will lead to greater participation of citizens.
- District assemblies should enforce their by-laws even in the absence of a sanitation day law to ensure maximum participation. The central government must demonstrate its commitment to the timely and

[1] 'Tae kwon do,' similar to 'karate,' is a sport; it originated from Korea and involved people fighting with their arms, legs, and feet. http://dictionary.cambridge.org/dictionary/english/tae-kwon-do.

immediate release of DACF to enable local assemblies to acquire facilities necessary for the implementation of by-laws.

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Diagnostic Accuracy of Ultrasonography Versus Computed Tomography for Ureteric Calculi Among the Adult Patients Visiting Mayo Hospital Lahore

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Abstract

Background: Uretric calculi was most commonly found associated with ureteric colic. It occurs due to low fluid intake, frequent urinary tract infections and medicines that may crystallize within the urine. Ureteric calculi are mostly composed of calcium which crystallizes in the kidney and moves down to ureter causing obstruction. The prevalence of ureteric colic is increasing everyday. Over-utilization of Computed tomography is a growing health concern because of the used of high radiation in computed tomography. Objective: To determine the diagnostic accuracy of ultrasonography versus computed tomography for ureteric calculi among the adult patients visiting Mayo hospital Lahore. Methods: This Cross-sectional descriptive study was conducted in the Department of Radiology in Mayo hospital Lahore. All patients with ureteric colic (as per operational definition) and with suspicion of ureteric calculus were included. The ct-scan machine of Hitachi (164 slices) and Ultrasound machine Siemens was used to performing this research to determine the diagnostic accuracy of ultrasonography versus computed tomography for ureteric calculi among the adult patients. Ureteric stones were diagnosed on a trans-Abdominal scan by using of 5MHz frequency. Results: Total 78 patients with sign and symptoms of ureteric calculi were imaged with ultrasonography and computed tomography, among them ureteric calculi were found in 25 (34.2%) patients with ultrasound. Ureteric calculi were found in 52(71.2%) with computed tomography scanning. The individuals of 17-75 years were mainly involved while most of them were male patients. We observed that, computed tomography scanning is batter to diagnose ureteric calculi as compared to ultrasonography.

Keywords: Ultrasound, Ureteric Calculi, Renal Stones, Hydronephrosis, Urolithiasis

Introduction

Ureteric stone is a kidney stone mostly small that normally moves down into the ureterusually composed of undissolved mineral and can easily be stuck in a narrow part of the ureter and leads to the obstruction at any point from the ureteropelvic junction (UPJ) toureterovesical junction (UVJ). These are a subset of the broader topic of urolithiasis. Urolithiasis is common in patients who present with hematuria and/or acute pain located in the flank area[i].Acute ureteric colic is one of the worst pain a patient ever experiences in his/her life[ii]. It is estimated that up to 6% of women will experience one or more renal calculi episodes in their lives with a recurrence rate of 50%. One in four patients with renal calculi has a family history of renal calculi a situation that multiplies the risk of lithiasis by three[iii]. Men are more commonly affected than women[iv]. These patients require periodic imaging studies to monitor the stone position and to assess for hydronephrosis. There is high variability in determining the choice of imaging protocols to observe the progression of ureteral calculi for following up[v]. Protocols guiding imaging use in the management of ureteral calculus disease are desirable because of the potentially harmful cumulative effects of radiation exposure to patients and the increased cost of high-resolution axial imaging moralities [vi] .
Computed tomography (CT) has become the primary imaging modality for evaluating acute flank pain and suspected renal stone disease[vii]. Because of its high sensitivity (95-97 %) and specificity (96-100 %) for urinary tract calculi detection[viii]. CT is of particular value for detecting ureteral calculi, which often are not visualized with other imaging modalities[ix].

However, CT entails exposure to ionizing radiation with attendant long term cancer risk,4-7 is associated with a high rate of incidental findings that can lead to inappropriate follow-up referral and treatment[x]. Although computed tomography (CT) has gained widespread acceptance as the prime investigation having several advantages over other imaging techniques (X-Ray, Ultrasound, Magnetic Resonance Imaging) [xi] . Ultrasonography (USG) can serve as an alternate for initial screening in the patients[xii]. Ultrasound (US) is pain relief. Ultrasound (US) has limited diagnostic value in the assessment of patients with suspected renal stones even when performed by experienced hands particularly in the evaluation of distal ureteric calcul. It can easily identify the stones located in the pyeloureteric and vesicoureteric junctions(VUJ), as well as the complications caused by stones such dilatation of pelvicalyceal system and / or ureter proximal to obstruction and infections[xiii]. Medium and large renal lithiasis (> 5mm) can be easily detected with 2D ultrasonography due to the different echogenicity with the adjacent parenchyma and the posterior acoustic shadowing[xiv]. Ultrasound accuracy could also be lower in specific patient subgroups, such as in obese patients, women, and in specific age groups, especially women of reproductive age [xv] . The sensitivity of the ultrasound scan is highly size dependent[xvi].However, the true sensitivity of US for renal calculi may be substantially less given evidence. Establishing the sensitivity of US for renal calculi will allow informed decisions regarding which type of imaging examination to perform for a given clinical situation[xvii]. The sensitivity of US for detecting renal calculi has been reported to be as high as 96%. For all stones, US have a sensitivity of 19–93% and specificity of 84–100%[xviii].

Methods

A Cross-sectional descriptive study was conducted in the Department of Radiology in Mayo hospital Lahore. Our sample size was 78 patients. 78 patients were included after the approval of synopsis from an institutional review board (IRB). All the adult patients younger than 75 years with suspicion of ureteric calculi were included. Ultrasound machine Siemens and CT-Scan machine of Hitachi (164 slices) were used to perform this research to determine to determine the diagnostic accuracy of ultrasonography versus computed tomography for ureteric calculi among the adult patients . Ureteric Calculi was diagnosed on a trans-Abdominal scan by using a curved array transducer of 5MHz frequency and Hitachi (164slices) CT-Scan . Figure 1 shows a trans-abdominal scan of 27 years old male in which calculus is present in the right vesico-ureteric junction . CT-scan of 36 years old male in which shows a ureteric calculus in proximal ureter in Figure 2.

Results

In this study total frequency of the patients was 73 comprising 47 males (64.4%) and 36 females (35.6%). Mean age of the patients was 37.0417±12.7 (17-75 years). Graph number 1 shows descriptive statistics of age in years. Frequency on ultrasound in Staghorn calculus was 1 (1.4%), frequency in PUJ calculus was 7 (9.6%),frequency in Hydroureter was 8 (11.0%), frequency inVUJ calculus was 10 (13.7%), frequency in Hydronephrosis was 22(30.1%) and frequency in Ureteric calculus was 25(34.2%). Demographic details of Ultrasonographic findings are given in Table-1. Graph number 2 shows descriptive statistics of findings in Ultrasound. Frequency on Computed Tomography in normal was 1 (1.4%), frequency in Renal calculus was 2 (2.7%),frequency in Hydronephrosis was 2(2.7%), frequency inVUJ calculus was 8 (11.0%), frequency inVUJ calculus was 8 (11.0%) and frequency in Ureteric calculus was 52 (71.2%). Demographic details of computed tomographic findings are given in Table-2. Graph number 3 shows descriptive statistics of findings in Computed Tomography.

Figure- 1

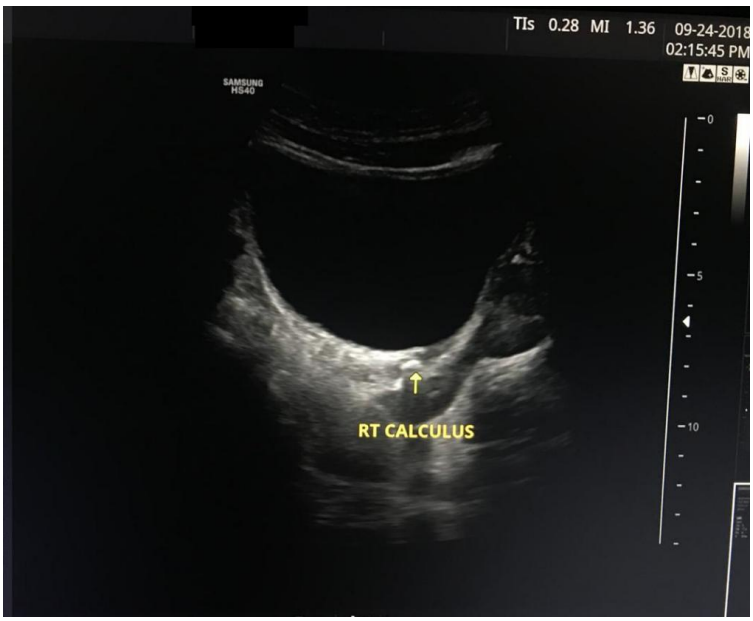
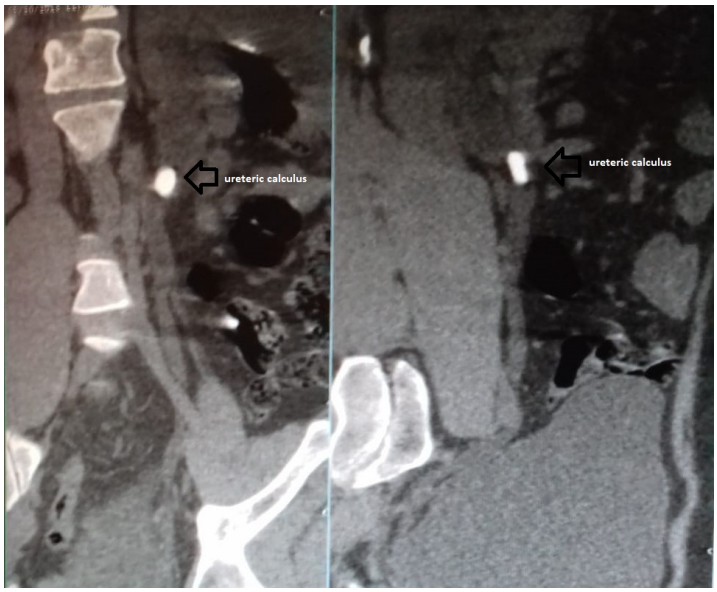


Figure- 2



Graph-1 Descriptive statistics of age in years

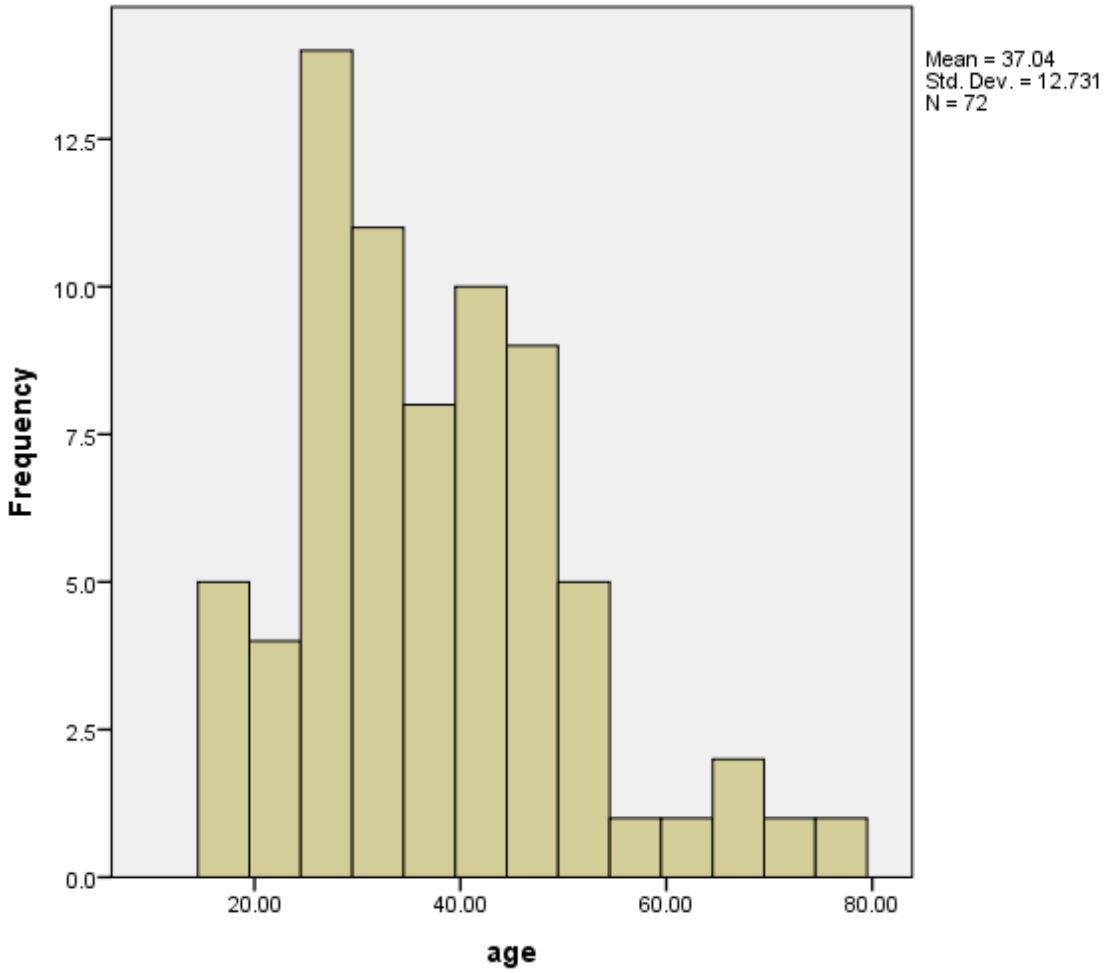


Table-1 ultrasonographic findings

USG findings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hydronephrosis	22	30.1	30.1	30.1
	Hydroureter	8	11.0	11.0	41.1
	PUJ calculus	7	9.6	9.6	50.7
	Staghorn calculus	1	1.4	1.4	52.1
	Ureteric calculus	25	34.2	34.2	86.3
	VUJ calculus	10	13.7	13.7	100.0
	Total	73	100.0	100.0	

Graph-2 Descriptive statistics of diagnosis of Ultrasound.

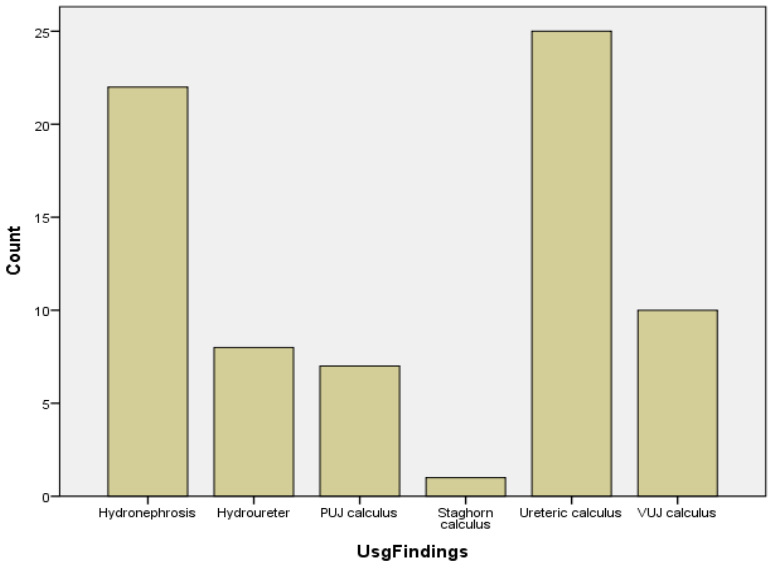
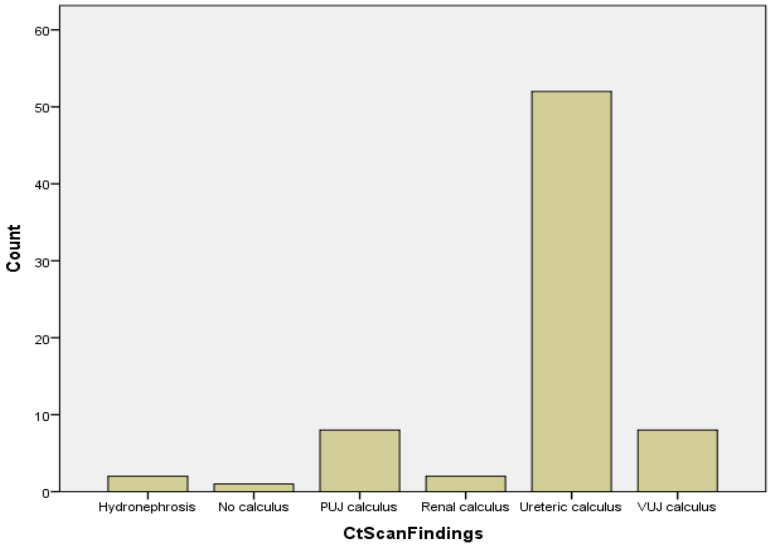


Table-2 Computed Tomographic findings

CT Scan Findings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hydronephrosis	2	2.7	2.7	2.7
	No calculus	1	1.4	1.4	4.1
	PUJ calculus	8	11.0	11.0	15.1
	Renal calculus	2	2.7	2.7	17.8
	Ureteric calculus	52	71.2	71.2	89.0
	VUJ calculus	8	11.0	11.0	100.0
	Total	73	100.0	100.0	

Graph-3 Descriptive statistics of diagnosis of Ultrasound.



Discussion

In the current study it was noted that, a study was performed by Viprakasit DP et al in 2011 Limitations of renal Ultrasound in the evaluation of Urolithiasis: A co-relation with Computed Tomography . Urolithiasis is a common finding in patients who present with acute flank pain or hematuria. The prevalence of urolithiasis is increasing everyday .ureteric colic associated with ureteric calculi a severe and complex clinical problem. Radiological studies have an important role in early diagnosis of ureteric calculi.the discrepancy between CT and ultrasound imaging is high (39%) in the evaluation of urolithiasis. In our cohort, 20% of studies exhibited significant differences which could have led to alternative management practices. Despite continued concern for excessive lifetime radiation exposure with CT, urologists should recognize limitations of imaging such as ultrasound in the evaluation of urolithiasis though RUS remains useful for detecting hydronephrosis/obstruction[xix].

A systematic review of studies was carried out at King Edward Medical University in 2015 to compare the sensitivity and specificity of computed tomography and ultrasound, to diagnose ureteral colic in 250 patients presented with lumber pain. They concluded computed tomography the best and reliable technique to detect renal calculi however, ultrasound was found a preferred substitute to computed tomography to lessen radiation dose. Ultrasound has limited value for accurate detection of stone in the ureter. Any patient presenting with renal colic had to undergo plain CT (KUB) because ultrasound is operator dependent. Factors like patient compliance or obesity limit the ultrasound investigation of renal calculi[xx].

Another study was accomplished by Noreen A, Javed AM in 2016. Found sensitivity of ultrasound is not efficient but it is readily available and reliable in investigating the patients with flank pain with 100% specificity, sensitivity 95% and no harmful X rays. They concluded CT should be used as follow-up and investigative tool[xxi].

Conclusion

We observed that, Computed Tomography is batter imaging modality as compared to ultrasonography for diagnosis of ureteric calculi. Ultrasound has shown limitation for certain conditions or ultrasound accuracy was also lower in specific patient subgroups

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Prevalence of Coronary Variants and Anomalies Detected on Computed Tomography Angiogram (CTA) Cardiac Among Patients

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Objectives:

To estimate the prevalence of coronary variants and anomalies detected on CTA cardiac patients.
To determine demographics characteristics of the study respondents based on age, sex and coronary dominance.

To determine any association between coronary variants and anomalies with:
(i) total calcium score
(ii) stress test results
(iii) other concurrent congenital heart disease
iv) significant / insignificant coronary artery occlusion
(v) underlying myocardial infarction.

Methods

- 83 CTA cardiac studies were included and analysed in this retrospective study.
- These data were retrieved from hospital's archiving computer system (PACS) database.
- All of these CTA cardiac examinations were performed by using Siemens MDCT Scanner 64 slices.
- The identification of coronary variants and anomalies were performed by one trainee radiologist and subsequently verified by a cardiac radiologist.
- The data was analyzed by using Fisher's Exact Test with significant value taken as $p < 0.05$.

Results

Detection of coronary variants and anomalies - 25.3%.

- Ramus intermedius (RI) - 20.4%
- Myocardial bridging of LAD (MB) - 3.6%
- Left circumflex arising from right aortic cusp -1.2%.

The patients who had CTA cardiac done were:

- within the range of 41 to 60 years old (54.2 %)

- majority were male patients (67.5%)

Mostly are of right coronary dominance (86.7%).

No significant association found between coronary variants and anomalies with;
(i) total calcium score (p = 0.220),
(ii) stress test results (p = 0.085),
(iii) other concurrent congenital heart disease (n = 0)
iv) significant / insignificant coronary artery occlusion (p = 0.295)
(v) underlying myocardial infarction (n = 0).

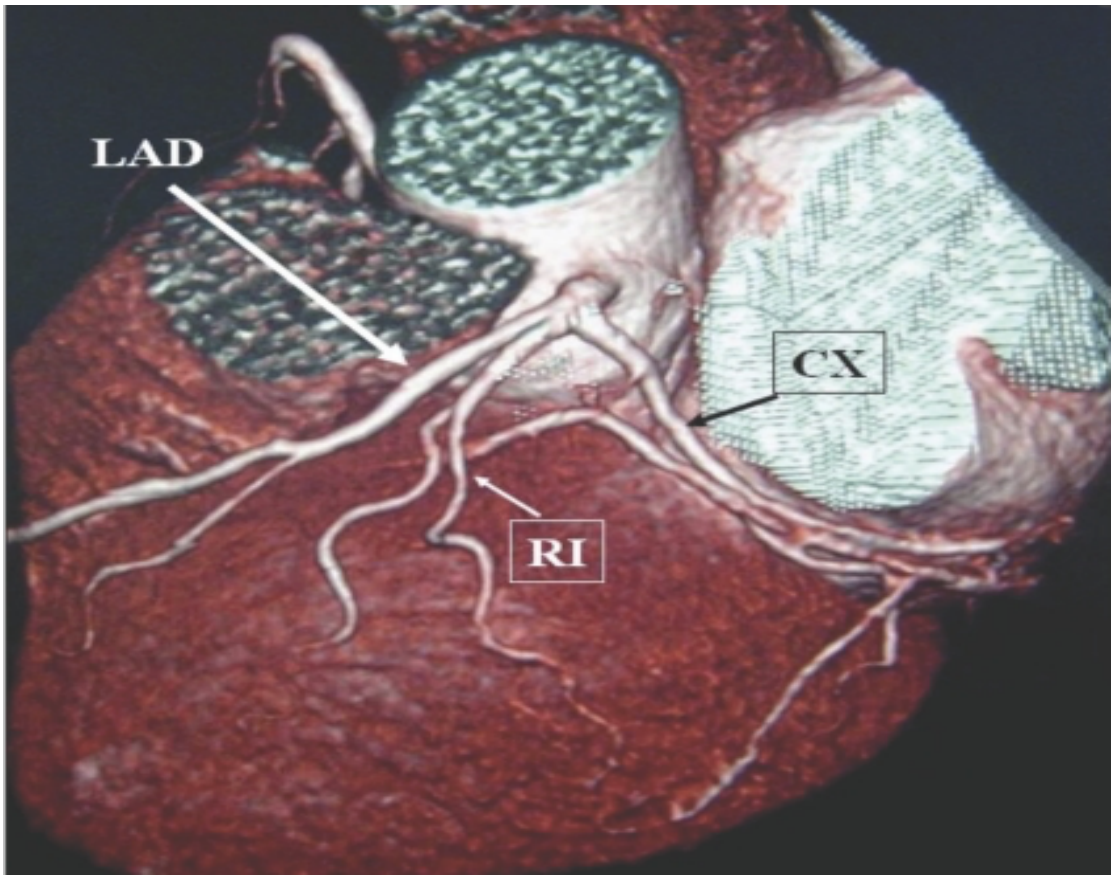

Figure 1: Incidental findings of Ramus Intermedius (RI) in a 58-year-old man.Volume rendering technique (VRT) image showing left main coronary artery (LM) with trifurcation into left anterior descending (LAD) as shown in thick white arrow, Circumflex artery (Cx) as shown in thin black arrow, and Ramus Intermedius (RI) s shown in thin white arrow.

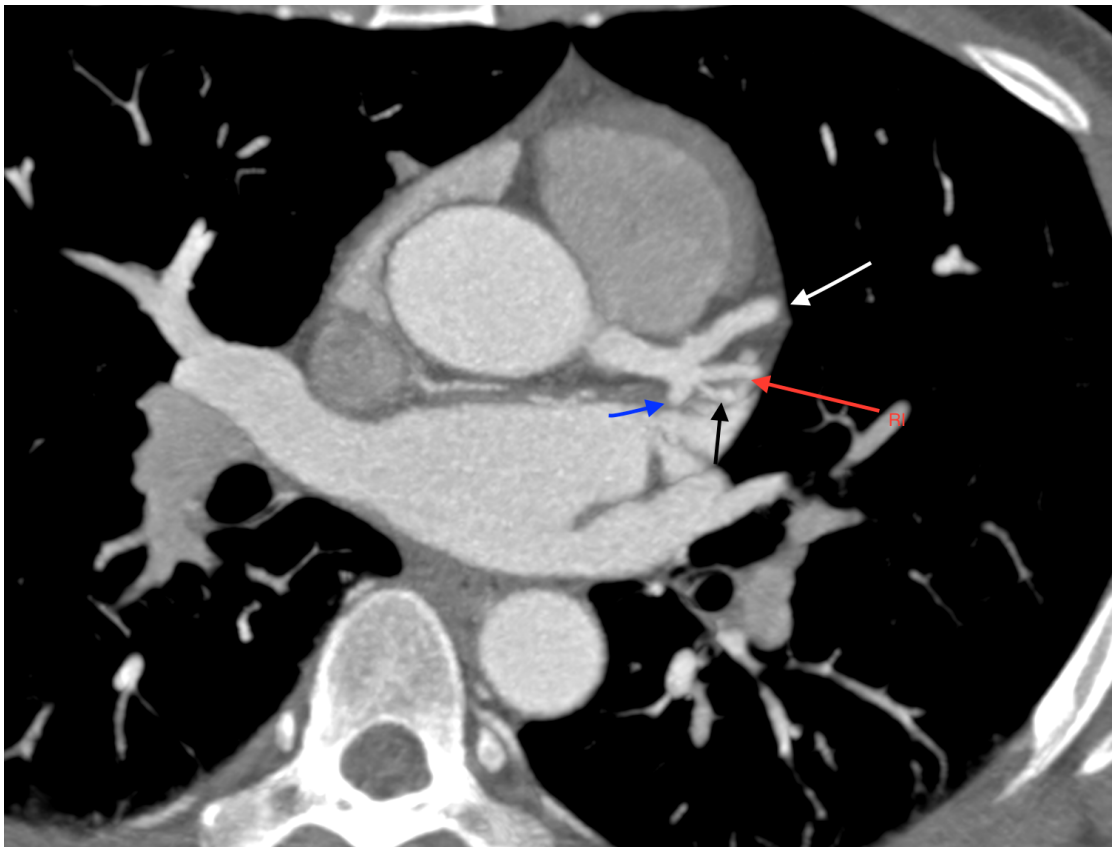

Figure 2: Axial CTA cardiac in a 65 years old man, showing trifurcation of LM coronary artery Ramus Intermedius (red arrow), Proximal Left circumflex artery (blue arrow) and Proximal Left anterior descending artery (white arrow).

Also seen here is early take off obtuse marginal 1 artery (black arrow)

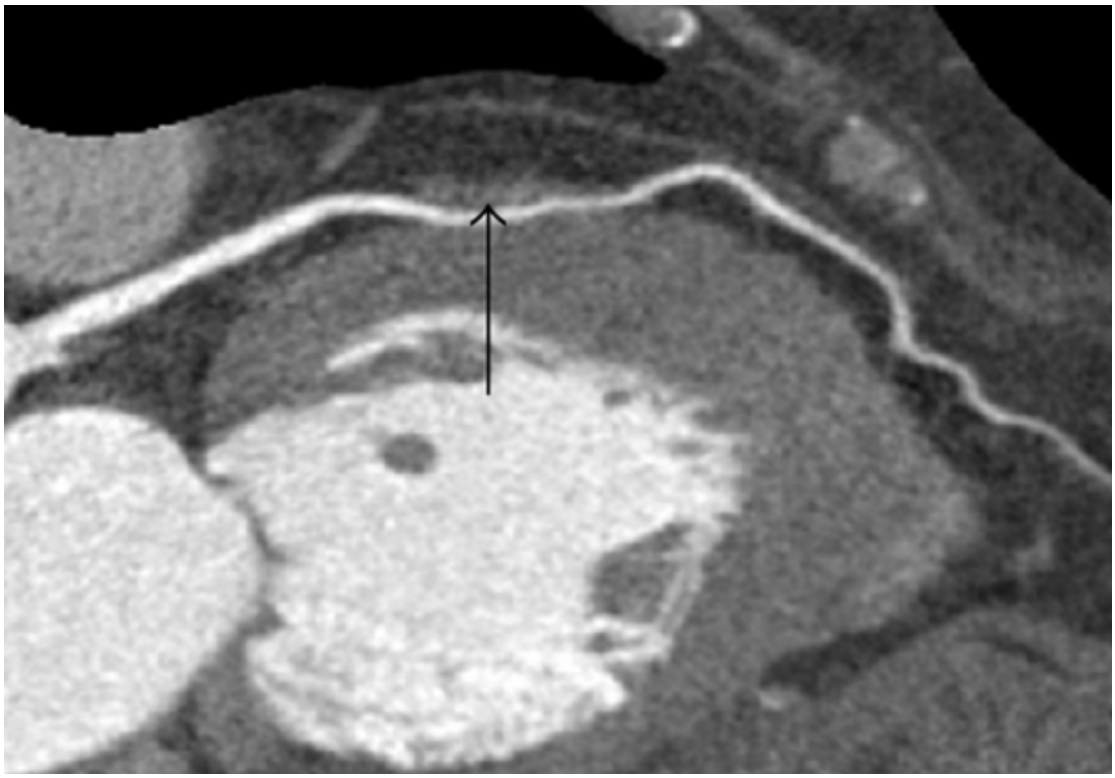

Figure 3: Maximal Intensity Projection image (MIP) showing myocardial bridging of left anterior descending artery (LAD) which traverses superficially within the myometrium (black arrow).

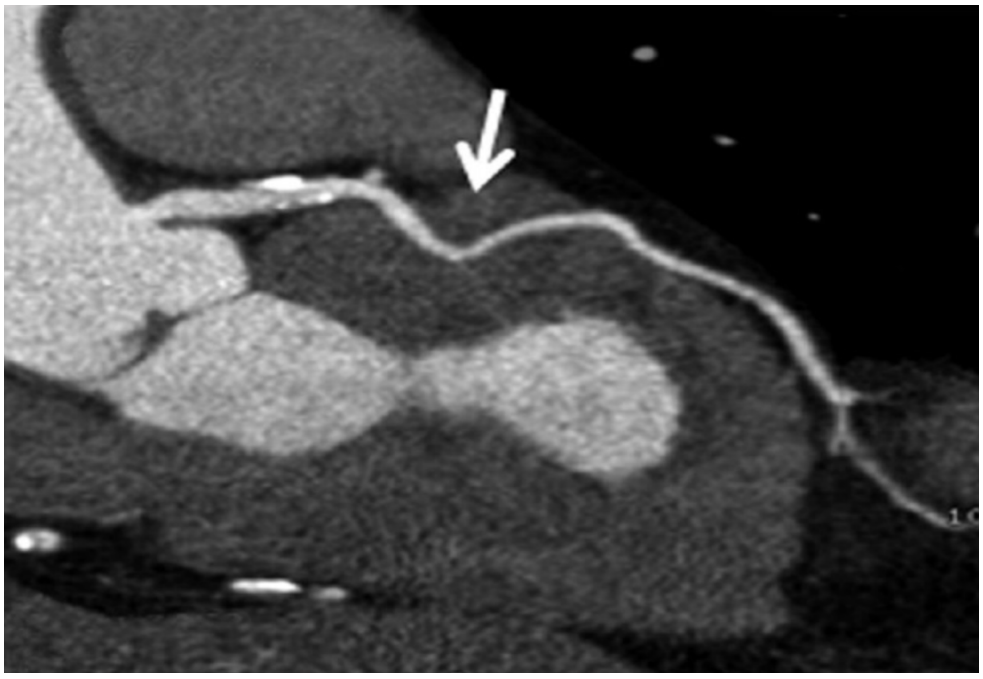

Figure 4: Maximal Intensity Projection image (MIP) showing myocardial bridging of left anterior descending (LAD) which traverses more in depth within the myometrium (white arrow).

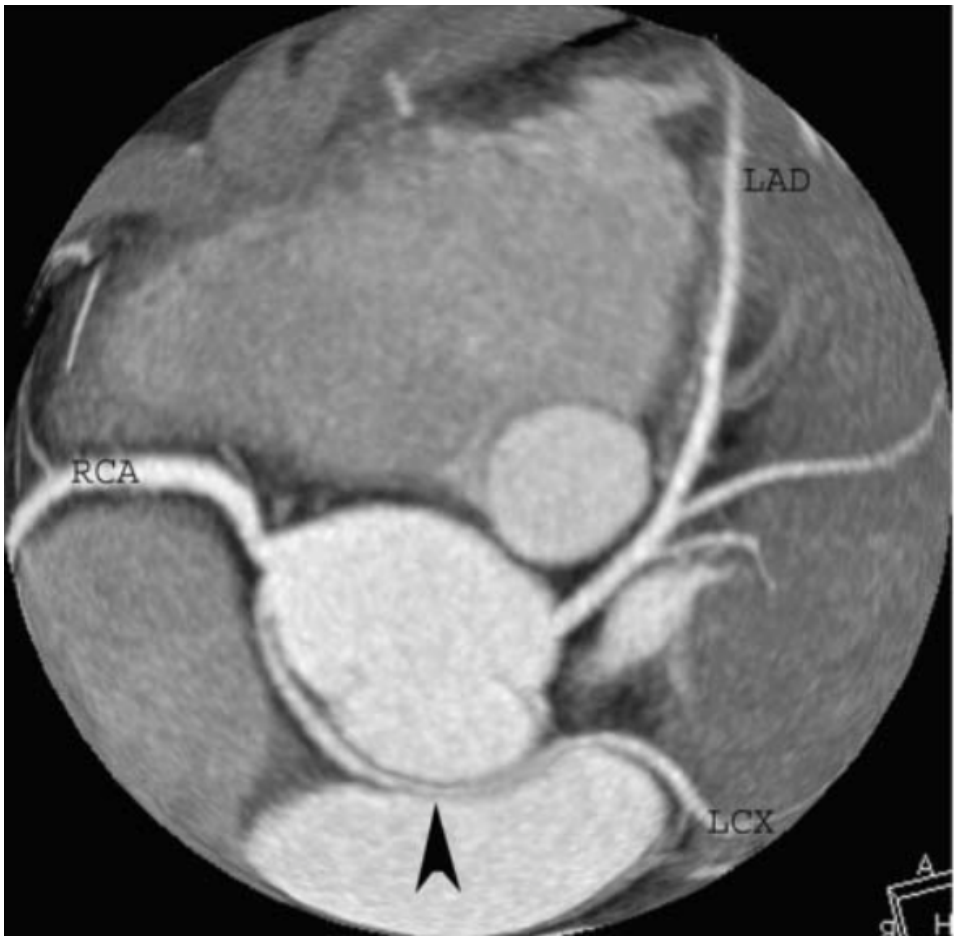

Figure 5: Anomalous course of the left circumflex artery (black arrow head) between the aortic root (star) and left atrium (blue arrow). Also visualised are right coronary artery (RCA) and left anterior descending artery (LAD).

CONCLUSION

The detection of coronary variants and anomalies was 25.3%, which is higher than previous reported study. This acquired data of prevalence of coronary variants and anomalies is the first ever data documented in Pakistan.

We recommend that CTA cardiac probably can be used as screening tools, a baseline study, during pre-surgery or pre-interventional work up. CTA cardiac has been the most reliable tool for identification of coronary variants and anomaly in opposed to conventional catheter angiogram.

CT examination has several advantages over conventional angiogram because it is non-invasive with visualisation of both vessels, lumen and simultaneous visualisation of all coronary arteries and all cardiac chambers. It is also superior to conventional angiogram in delineating the origin and proximal course of anomalous coronary arteries as well as in patients with myocardial bridging who presented with chest pain or even myocardial infarction.

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Sonographic Comparison of Congestive Index of Portal Vein with and Without Chronic Liver Parenchymal Disease

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Abstract

Background Chronic liver disease is an oncogenic disease, and if not treated, it will most likely lead to hepatocellular carcinoma or death. In the past 30 years, major progress in the knowledge and management of liver disease has been observed. Cirrhosis and primary liver cancer represent the end-stage of chronic liver disease and thus are indicative of the burden of this disease. Objectives: To determine the sonographic comparison of the congestive index of portal vein with and without the chronic liver parenchymal disease. Methods: The study was carried out in Gilani Ultrasound Center Lahore, & Nishtar Hospital Multan, Pakistan, for the duration of Six months with two hundred patients (100 patients with chronic liver disease and 100 normal subjects) selected using non-probability convenient sampling technique. Results: Mean age of the patients was 40.78±0.40 vs. 40.42±0.46 years respectively in group A and B. There were [57(57%) vs. 40(40%)] male subjects in group I and II respectively, and [43(43%) vs. 60(60%)] female subjects in group I and II respectively. In our study, significantly increased congestion index was observed in Group I as compared to Group II (p=0.0000185). Conclusion: Congestion index was higher (almost doubled) in Chronic Liver Disease as compared to the control group.

Keywords: Congestion Index, Chronic Liver Disease, Portal Vein

Introduction

Chronic liver disease (CLD) is an oncogenic disease and lead to hepatocellular carcinoma (HCC) or death if not treated. CLD is a global public health disease affecting millions of people (Marinho RT, Giria J, & Moura MC, 2007). Cirrhosis and primary liver cancer represent the end-stage of CLD and thus are indicative of the burden of this disease (Blachier M, Leleu H, Peck-Radosavljevic M, Valla D-C, Roudot-Thoraval F, 2013). The most probable outcome of cirrhosis is HCC, which is the fifth most common cause of cancer. Developing countries like Egypt (22%), Pakistan (4.8%), and China (3.2%) are affected with hepatitis C virus chronically (Shepard CW, Finelli L, & Alter MJ, 2005). There are 14−26 new cirrhosis cases per 100,000 inhabitants per year or an estimated 170,000 deaths per year (McGlynn & London, 2005). Four leading causes of cirrhosis are chronic alcohol consumption, chronic viral hepatitis B, chronic viral hepatitis C and non-alcoholic fatty liver disease (NAFLD). If detected in time, each of these causes is responsive to treatment. CLD is characterized by a silent

and asymptomatic phase, and its solution is early detection and staging (Sherlock & Dooley, 2002). The developing of medical technology and more strong techniques of computer vision and machine learning are now creating new algorithms to assess liver disease, clustered in what is now known as translational medicine (Sporea I, Popescu A, & Sirli R, 2008). Ultrasound (US) is the first line diagnostic imaging modality in most of the abdominal exams, including the liver, because it is non-ionizing, non-invasive, non-expensive and it is available in almost all medical facilities. US image formation process is based on the interaction of acoustic waves with tissues.

Therefore, changes in textural characteristics of the US images may reveal pathological conditions in the microarchitectural and acoustic interfaces of the tissues. The evolution of CLD is characterized by different stages, each one with particular pathological characteristics and outcomes. Initial stages are usually steatosis or hepatitis, which can have several causes (World Health Organization[WHO], 1998). The end-stage of any liver disease is cirrhosis which typically precedes and empowers the development of HCC. This last pathological condition is one of the most frequent malignant tumors in the world, being the third cause of death from cancer in men (Maeda K, Utsu M, & Kihaile PE, 1998). Late detection is a key problem on CLD treatment because of its silent beginning (asymptomatic), causing globally high morbidity and mortality rates. A cirrhotic patient with clinical complications, such as ascites, has only 40% rate of survival in 2 years (Lee CH, Choi JW, Kim KA, Seo TS, Lee JM, & Park CM, 2006). Early detection of CLD is important. LB is not suited for use as a simple, fast and easy screening tool for CLD, since it is highly invasive, with low patient acceptance. This leads to the design of novel non-invasive approaches including portal vein maximum velocity (Vmax), portal vein minimum velocity (Vmin), portal blood flow volume, congestive index, and portal venous index (VPI). The World Health Organization (WHO) refers that US image modality is safe, effective, and highly flexible, providing clinically relevant information in a rapid and cost-effective fashion (WHO, 1998, Yeh WC, Jeng YM, Li CH, Lee PH, & Li PC, 2005). Portal vein velocimetry could be done with Doppler ultrasound in case of portal hypertension portal vein diameter increases while mean velocity decreases. It is therefore justified to determined portal vein congestive index in chronic liver parenchymal disease (Arena U, Vizzutti F, Corti G, Ambu S, Stasi C, Bresci S, et al., 2008). Congestion index was defined by Moriyasu et al. in 1986 as the ratio of cross-sectional area to portal flow velocity (Moriyasu F, Nishida O, Ban N, Nakamura T, Sakai M, Miyake T, et al., 1986). This index has been shown to be more sensitive and more specific in the diagnosis of portal hypertension than measurements of portal velocity (Haag K, Rössle M, Ochs A, Huber M, Siegerstetter V, Olschewski M, et al, 1999), although it was also found to have a critical limitation in that it needed a very skillful operator (Buonamico & Sabbá, 1991). For simplicity, the author set up a new index, the portal hypertension index, calculated as the ratio of the main portal vein dimension (D, mm) at the porta hepatis to the mean portal velocity (Vmean, cm/s) at the same site (Wu CC, Yeh YH, & Hwang MH, 1994), to detect portal hypertension in an easier way. Both the congestion index and the portal hypertension were recently demonstrated to be valuable in differentiating between chronic viral hepatitis and compensated early-stage cirrhosis (Iliopoulos P, Vlychou M, Margaritis V, Tsamis I, Tepetes K, Petsas T, et al., 2007, Iliopoulos P, Vlychou M, Karatza C, Yarmenitis SD, Repanti M, Tsamis I, et al, 2008).

Methods:

It was a cross-sectional study carried out in Gilani Ultrasound Center Lahore, & Nishtar Hospital, Multan, Pakistan for six months during the period of 1st May 2018 to 31st October 2018. Two hundred subjects, i.e. 100 individuals with liver parenchymal disease (Group I) and 100 individuals without liver disease (Group II) were selected by convenient sampling. Subjects including both male and female gender, age 13-80 years were included.

Patients with hepatic transplant and gastric varices were excluded. The ultrasound machines of Mindray Z5 and Toshiba xario 100 with convex transducer probe of 3-5 MHz were used to evaluate the patients. The study was started after informed consent. Descriptive statistics were calculated for patient's age, PV congestive index, PV mean velocity, PV Diameter. Frequencies and percentages were calculated for gender, clinical findings in both groups. Post-stratification t-test was applied taking $p \leq 0.05$ as significant.

Results:

Mean age of the patients was 52.66±1.25 vs. 36.28±1.62 years respectively in group I and II. Mean PV diameter was 1.02±0.08 vs. 1.11±0.03 in group I and II respectively. Mean congestion index was 0.14±0.02 vs. 0.05±0.00 in group I and II respectively.

There were [1(1%) vs. 14(14%)] subjects of the age of 1–20 years in group I and II respectively. There were [10(10%) vs. 57(57%)] patients of the age of 21–40 years in group I and II respectively. There were [59(59%) vs. 18(18%)] subjects of the age of 41–60 years in group I and II respectively and there were [30(30%) vs. 11(11%)] subjects of the age of 61–80 years in group I and II respectively as shown in Table No.1.

There were [57(57%) vs. 40(40%)] male subjects in group I and II respectively, and [43(43%) vs. 60(60%)] female subjects in group I and II respectively. In Group I, 6(6%) patients were diagnosed to have chronic liver disease on ultrasonography, 81(81%) had coarse liver, 3(3%) had a coarse liver with ascites, 2(2%) had focal liver lesion, hepatocellular carcinoma was evident in 4(4%) patients, 2(2%) had mixed solid echogenic lesion and 2(2%) had portal hypertension. In our study, mean congestive index was 0.05±0.00 in Group II while it was 0.14±0.02 in Group II (almost 2 times higher). Post-stratification, T-test revealed significantly increased congestion index in Group I as compared to Group II patients (p=0.0000185).

Table 1: Age Distribution of the Patients Presented with & Without Chronic Liver Disease

Age (in years)	No. of Patients in Group I	No. of Patients in Group II
1 — 20	1(1%)	14(14%)
21 — 40	10(10%)	57(57%)
41 — 60	59(59%)	18(18%)
61 — 80	30(30%)	11(11%)
Total	**100(100%)**	**100(100%)**

Table 2: Gender Distribution of the Patients Presented with & Without Chronic Liver Disease

Sex	No. of Patients in Group I	No. of Patients in Group II
Male	57(57%)	40(40%)
Female	43(43%)	60(60%)
Total	**100(100%)**	**100(100%)**

Table 3: Clinical Findings on Ultrasound of the Patients Presented with & Without Chronic Liver Disease

Findings	No. of Patients in Group I	No. of Patients in Group II
CLD	6(6%)	0(0%)
Coarse liver	81(81%)	0(0%)
Coarse liver with ascites	3(3%)	0(0%)
Focal liver lesion	2(2%)	0(0%)
HCC	4(4%)	0(0%)
Mixed echogenic solid lesion	2(2%)	0(0%)
portal hypertension	2(2%)	0(0%)
Normal (no liver disease)	0(0%)	100(100%)
Total	**100(100%)**	**100(100%)**

Table 4: Descriptive Statistics

Variables	Mean ±S.E.M. in Group I	Mean ±S.E.M. in Group II
Age of Patients (years)	52.66±1.25	36.28±1.62
PV Diameter (cm)	1.02±0.08	1.11±0.03
PV Mean velocity (m/s)	11.94±0.39	20.68±0.49
PV congestion index (cmxsec)	0.14±0.02	0.05±0.00
Total	**100(100%)**	**100(100%)**

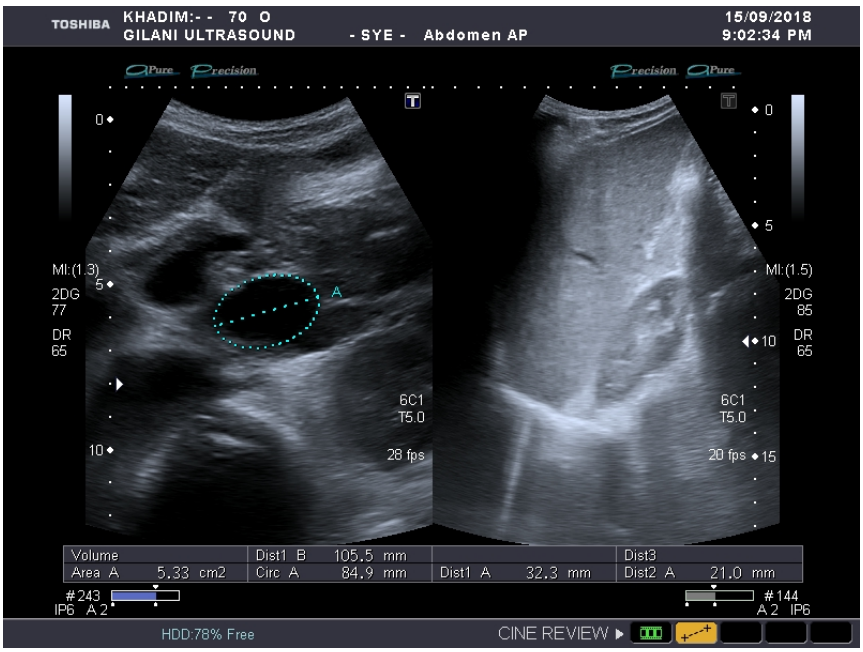

Figure 1: Ultrasound image showing normal portal vein diameter with fatty fibrotic liver parenchyma.

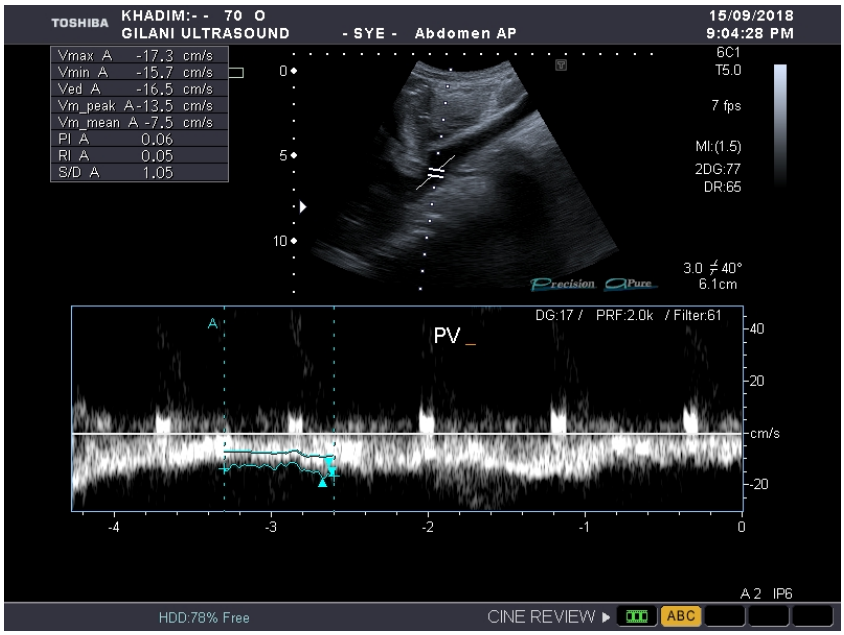

Figure 2: Ultrasound image showing a normal congestive index of the portal vein.

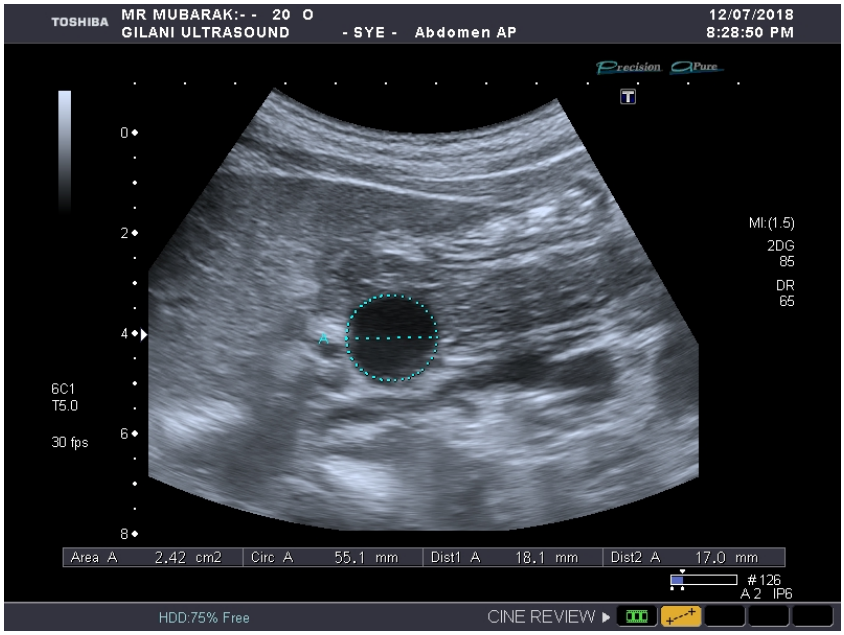

Figure 3: Ultrasound image showing the increased diameter of the portal vein in CLD.

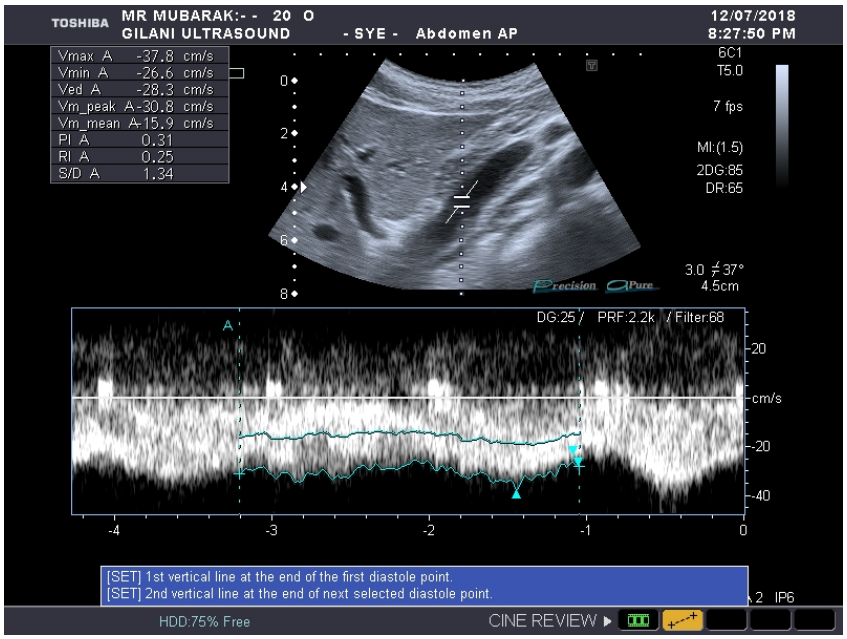

Figure 4: Ultrasound image showing an increased congestive index of the portal vein in CLD.

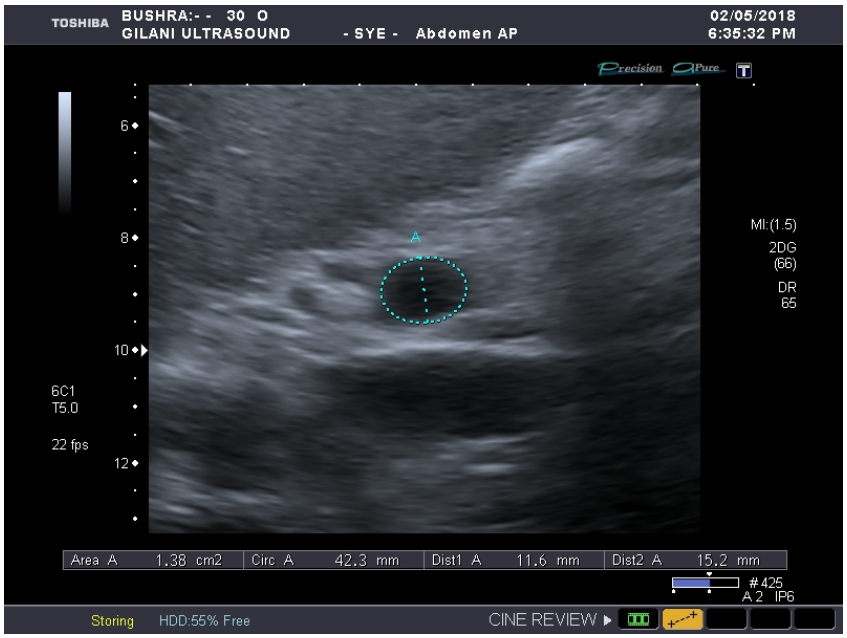

Figure 5: Ultrasound Image showing increased portal vein diameter in CLD.

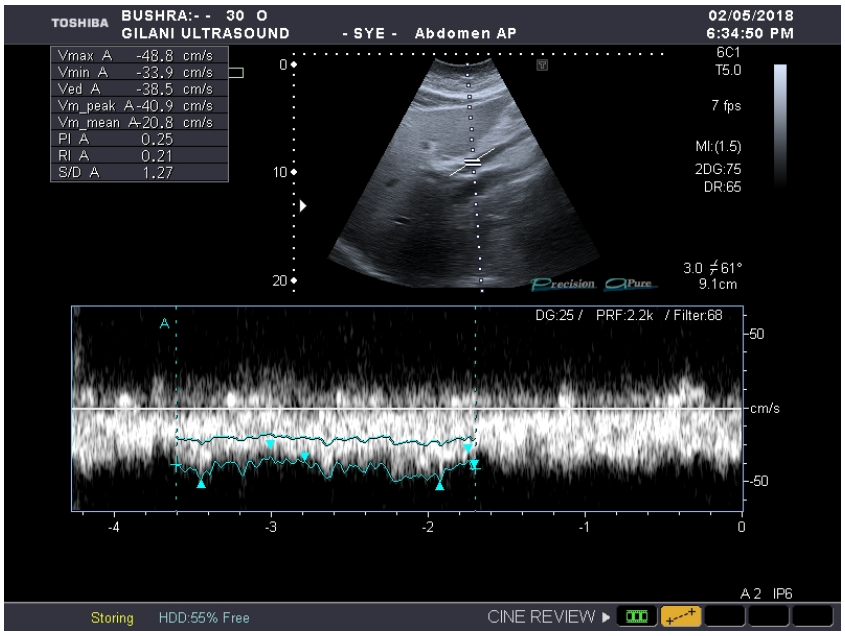

Figure 6: Ultrasound image showing an increased congestive index of the portal vein.

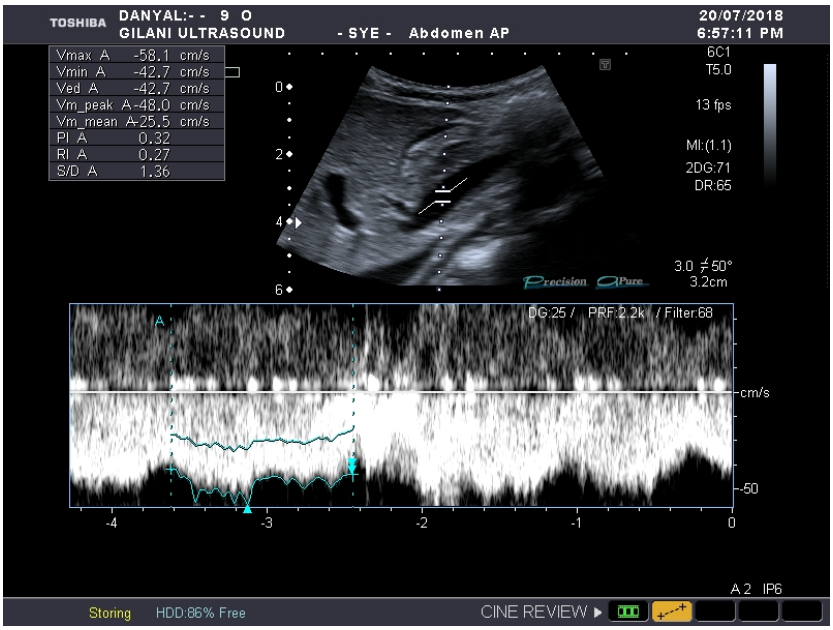

Figure 7: Ultrasound image showing an increased congestive index of the portal vein.

Discussion:

Doppler ultrasound is non-invasive and has no patient discomfort. It is a fast and easily reproducible technique that can study the hemodynamic alterations in the liver, especially in the portal vein. Congestion index is definitely a good predictor of the presence of liver cirrhosis with several authors reporting higher congestion index in alcoholic patients with de-compensated cirrhosis. Congestion index can also be evaluated as a parameter to predict the severity of liver disease in patients diagnosed with alcoholic cirrhosis. Also, it can be used to stage the disease as early or late cirrhosis. Further analytical studies may confirm the use of congestion index as a significant prognostic factor in the evaluation of several liver diseases (Yin XY, Lu MD, Huang JF, Xie XY, Liang LJ, 2016, Kayacetin E, Efe D, & Doğan C, 2016, Mahmoud HS, Mostafa EF, & Mohammed MAW, 2016).

Congestion index is a reliable indicator to differentiate between chronic viral hepatitis and alcoholic cirrhosis. Previous studies have evaluated the congestion Index for many different clinical applications in diseases involving the liver. Congestion index is a simple, inexpensive, noninvasive and accurate tool to differentiate alcoholic cirrhosis, NAFLD and viral hepatitis as an alternative to liver biopsy.

This study aimed to compare the congestion index in normal and diseased patients of the liver. Significantly increased congestion index was observed in patients with liver disease as compared to normal subjects (0.14±0.02 vs. 0.05±0.00) in the present study.

Moriyasu et al. 1986, have determined indices in normal subjects as 0.070±0.029 cmxsec whereas in acute hepatitis 0.071±0.014 cmxsec; chronic active hepatitis 0.119±0.084 cmxsec; cirrhosis 0.171±0.075 cmxsec; and idiopathic portal hypertension 0.180±0.107 cmxsec. There was a statistically significant difference between the congestion indices from the normal subject group and indices obtained from patients with chronic hepatitis, cirrhosis, and idiopathic portal hypertension.

Anup Chakravarthy et al. have recorded a congestion index of 0.02-0.03 in most of the normal subjects in their study while median congestion index in NAFLD -0.027. A significant difference was found in the congestion index present between the normal subjects and patients with NAFLD ($p=0.006$). Median congestion index in chronic viral hepatitis was -0.050. A significant difference in congestion index was present between the normal subjects and patients with chronic viral hepatitis ($p<0.001$). Median congestion index in patients with alcoholic cirrhosis was -0.060. A significant difference in congestion index was present between the normal subjects and

patients with alcoholic cirrhosis ($p<0.001$) (Chakravarthy AJ, Thomas S, Mohanan K, Puthussery PV, Resmi S, Raini KP, 2017).

Iliopoulos P et al. 2007 have revealed portal vein congestion index in controls as 0.05±0.02 and in compensated liver cirrhosis as 0.09 ± 0.07 in their study in differentiation between chronic viral hepatitis and compensated early-stage cirrhosis.

Mortada HF El-Shabrawi and Associates have obtained congestion index 4.61±5.75 in controls while 9.50±1.60 in children with established cirrhosis (5 of metabolic etiology and 8 viral hepatitis C or B) ($p < 0.01$) and congestion index 4.97±1.14 in chronic hepatitis and no cirrhosis (5 children with viral hepatitis C or B and 7 autoimmune) (Mortada HF El-Shabrawi, Maissa El-Raziky, Maha Sheiba, Hanaa M El-Karaksy, Mona El-Raziky, Fetouh Hassanin, et al., 2010).

Conclusion

Our data shows that congestive index of the portal vein is a significant indicator and increased in CLD as compared to normal individuals.

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Frequency and Severity of Acute Adverse Effects of Low Osmolar Iodinated Contrast Media in Contrast-Enhanced Computed Tomography

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Abstract

Background: Nonionic, low osmolar agents are now used nearly universally for intravenous (IV) contrast administration in computed tomography. The osmolarity of a contrast agent is considered to be responsible for adverse effects in patients injected with contrast media. With the increase in its utilization, acute adverse reactions are suspected to rise substantially. Regardless of the usage of low osmolar non-ionic agents to reduce adverse effects, a large number of reactions are still experienced by patients. However, the frequency of immediate adverse contrast reactions to various low osmolar non‐ionic iodinated contrast media is not well studied. A basic understanding of the occurrence, risk factors and clinical features of these reactions is important as it can help in ensuring optimal patient care. Objective: To determine the frequency and severity of acute adverse reactions related to administration of low osmolar iodinated contrast media to patients during contrast-enhanced computed tomography scans. Methods: A cross-sectional study of intravascular doses of low osmolar non-ionic iodinated contrast media administered from October 2018 to February 2018 was conducted on patients undergoing CT examinations at Combined Military Hospital, Lahore. Acute adverse effects were characterized by using the data collected. These effects were investigated for determining the frequency and severity of reactions. Results: A total of 328 low osmolar iodinated contrast doses were administered to patients coming for CT examinations. 209 cases of acute adverse effects (63.72%) were identified. 90 out of 139 (64.75%) females, 117 out of 189 (61.90%) males were affected. Mild reactions were in the majority with the most common being nausea, sweating, and change in taste. Two cases of moderate reactions and no severe/fatal reactions were found over the study period. One case necessitated transfer to the emergency for urgent care. Female patients were affected more than males. Conclusion: Acute adverse reactions to the administration of low-osmolar non-ionic iodinated contrast agents are rare. The severity of these reactions is governed by multiple aspects of an examination, but the majority of them are mild. Moderate and severe reactions occur infrequently. Ideal patient care can be very helpful to combat these reactions.

Keywords: Non-Ionic Iodinated Contrast, Osmolarity, Anaphylactic Reaction, Vasovagal Reaction

Introduction

Contrast media are the most common pharmacological agents injected into the human body, used in approximately 75 million procedures per year worldwide[1] and have been utilized for imaging of structural anatomy and investigate typical and atypical physiological findings. With the introduction of advanced discriminational radiographic imaging procedures, the requirement for radiation rarefying contrast agents used in conventional radiographic techniques or recently, in image subtraction, has increased. Markedly, the most efficient and extensively administered contrast agents are iodine based[2]. Iodine-containing contrast media were initially used in the clinical setting with the development of sodium iodide in the 1920s, but their usage was limited by low-quality radiographic contrast and patient toxicity[3]. Iodinated contrast agents that are water-soluble extend all over the extracellular space. They can be injected straight into the body cavity, for instance, in the gastrointestinal and the urinary tract[4]. A standard contrast-enhanced CT uses ~40 grams of iodine chemically enchained to an organic molecule that is injected into the vascular system[5]. All presently used iodinated contrast media are categorized on the grounds of their chemical and physical traits, involving chemical composition, iodine content, osmolarity and ionization in solution. They are usually chemical variations of a 2, 4, 6-tri-iodinated benzene ring[6]. Compounds are either monomers (1 tri-iodinated benzene ring) or dimers (2 tri-iodinated benzene rings joined together by an organic functional group). Besides, the presence (i.e., ionic) or absence (i.e., non-ionic) of a carboxylate (-COO-) functional group on an organic side chain controls the ionic tendency. Generally, these agents are available as sodium, calcium salts or cations of methylglucamine, for the reason that (-COO-) component gives the molecule a net negative charge. The different characteristics, clinical uses, and toxicity levels of contrast media impact which type of agents are used by the imaging sector for particular indicated treatments. The charged ionic agents contribute to derange the electrical potentiality of the cytoplasmic membranes, justifying their enhanced toxicity, unlike non-ionic agents, that are uncharged. Ionic monomers have a weak capability for attenuation of x-rays and require to be applied in high concentration that is hyperosmolar compared to blood. They are known as high osmolar agents. Low osmolar agents constitute ionic dimers and nonionic monomers with a range of osmolarities from 290 to 860 mOsm/L[2]. In clinical practice, classification based on osmolarity is mostly used[6]. An implication of the osmolarity of an agent is defined by a ratio, obtained by dividing the number of iodine atoms in a solution with the number of particles in solution:

Contrast agent ratio = Number of iodine atoms/ Number of particles in solution

The high osmolar contrast substances have a greater number of subatomic constituents for each iodine atom and thus lower ratios[4]. High osmolar agents can disintegrate in an aqueous solution significantly , in contrast to low osmolar agents which usually own an osmolarity marginally higher than blood[7] and have arms with a strong affinity to water consisting amido linkages and hydroxyl substituents. The success of these molecules mainly dwells in some diacritic physico-chemical properties that conjoin low osmolarity with low viscosity to a high concentration in water and in the stability of iodine substitution and the high concentration of iodine per molecule. The side chains are valuable not only for increasing the aqueous solubility but also because they lessen the toxicity and escalate the expulsion of substances from the patient body[8]. High-osmolar iodinated contrast media paved the way for low-osmolar agents, as they are related to adverse reactions to a lesser extent[7]. The hyperosmolarity of contrast agents is considered to be responsible for several adverse effects in patients injected with contrast media coming for computed tomography scanning[9]. Despite the efforts to minimize the rate of unfavorable reactions to iodinated contrast media by using low osmolar nonionic agents, a large number of reactions are still encountered[10]. It is necessary to be aware of the possibility of adverse reactions against these compounds ranging from mild aggravations to life-threatening crisis[11]. The immediate/acute reaction occurs up to one-hour post injection and is related to the osmotic load or contrast media chemotoxicity[12]. These acute adverse reactions are of clinical concern because they are uncertain and cause discomfort to patients. The American College of Radiology (ACR) guidelines classify acute adverse reactions as allergic-like or physiologic and organize in terms of severity as follows: mild, moderate, or severe. The symptoms of allergic-like reactions resemble those of true allergic/anaphylactic reactions because an antigen-antibody response is sometimes unidentifiable and include skin and respiratory tract symptoms. The use of an iodinated contrast agent contributes to an adverse reaction by the emancipation of histamine from white blood cells (basophils, eosinophils), which is considered to be a vital process in the physiopathology of anaphylactoid reactions[7]. The

second type, physiologic reactions, include cardiovascular effects, especially problematic in patients with latent cardiac disease. These vasovagal reactions are characterized by hypotension with bradycardia and gastrointestinal signs (e.g., vomiting and nausea). Others include flushing, sweating, shivering, headache, dizziness, anxiety, and alteration of taste may also occur[13]. Overall, physiologic reactions are anticipated to be an outcome from a disruption in homeostasis. Additionally, the dose injected, and route of administration may control the prevalence of adverse reactions. Large intra-arterial doses (>100 ml) are correlated to increased risk[7]. Deaths prompted by iodine-based contrast are extremely uncommon attributing to renal failure, anaphylaxis or allergic reaction. Nearly all lethal reactions occur within minutes after injection and patients need to be under surveillance in this period. A fatal reaction may occur prior to inconsequential events, such as nausea and vomiting, or without warning. The majority of deaths occur in patients in older patients, above 50 years of age and can be caused by cardiac arrest, pulmonary edema, respiratory arrest, consumption coagulopathy, bronchospasm, laryngeal edema, and angioneurotic edema[14].

Methods

A cross-sectional study was conducted using the Toshiba Aquilion 64-slice CT scanner at Combined Military Hospital, Lahore. Data were collected from patients indicated with contrast-enhanced computed tomography including male and female patients of age 16 years or older having acute reactions to the low osmolar contrast agent used. Patients were reviewed for pertinent medical history of undergoing a CT examination, previous allergy from contrast material, intake of medication for diabetes and history of asthma. Before administration of contrast, patients were checked for the type of CT scan, serum creatinine/eGFR, type of contrast agents used, amount of contrast to be given and administration site. The severity of reactions to the contrast agent was classified into mild, moderate or severe as per the guidelines are given by the American College of Radiology. Patients who had delayed reactions or serum creatinine concentration >1.5mg/dL and eGFR <60mL/min/1 were excluded from this study.

Results

From October 2018 to February 2018, a total of 328 patients (ages between 16 and 80 years old; 189 males, 139 females) were administered low-osmolar iodinated contrast doses over the study period. Among these doses, 316 were of Ultravist, and 12 were of Omnipaque. A total of 209 (63.72%) of acute adverse reactions were identified and affected 90 out of 139 (64.75%) females, 117 out of 189 (61.90%) males (Figure 1,2,3).

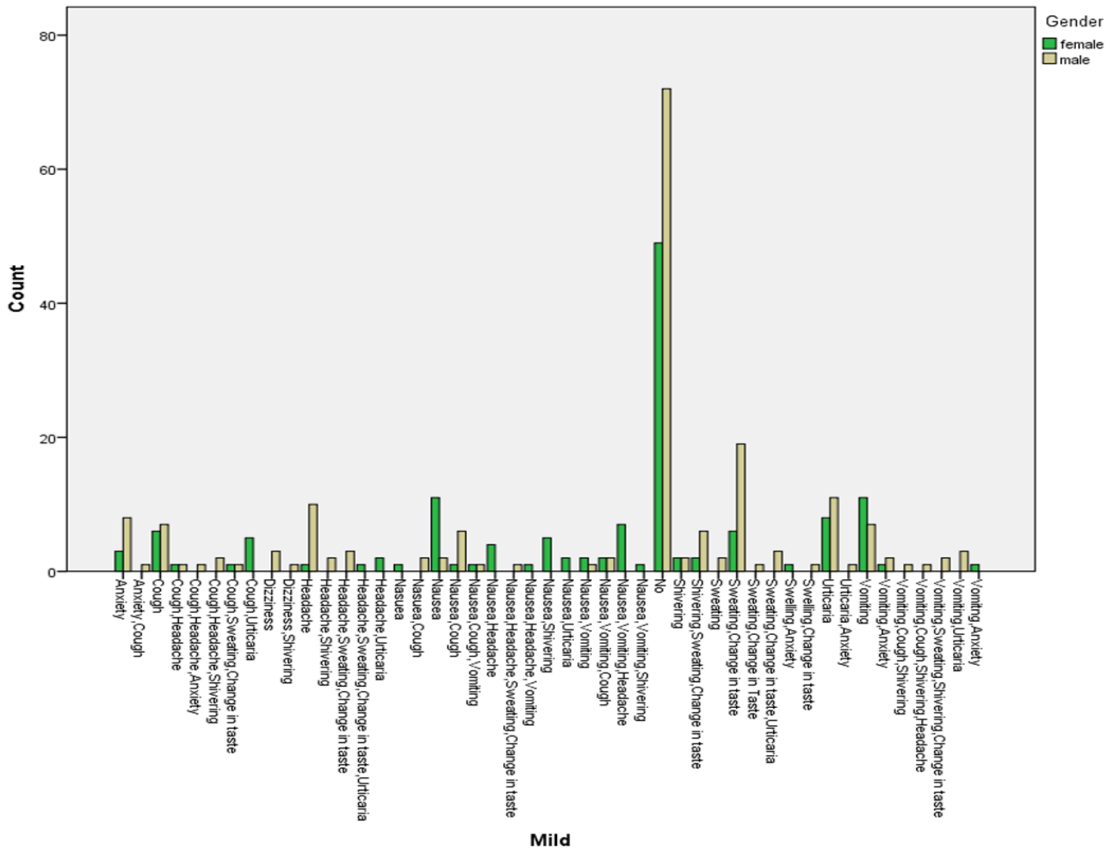

Figure 1. Graph representing the frequency of mild adverse reactions affecting females and males

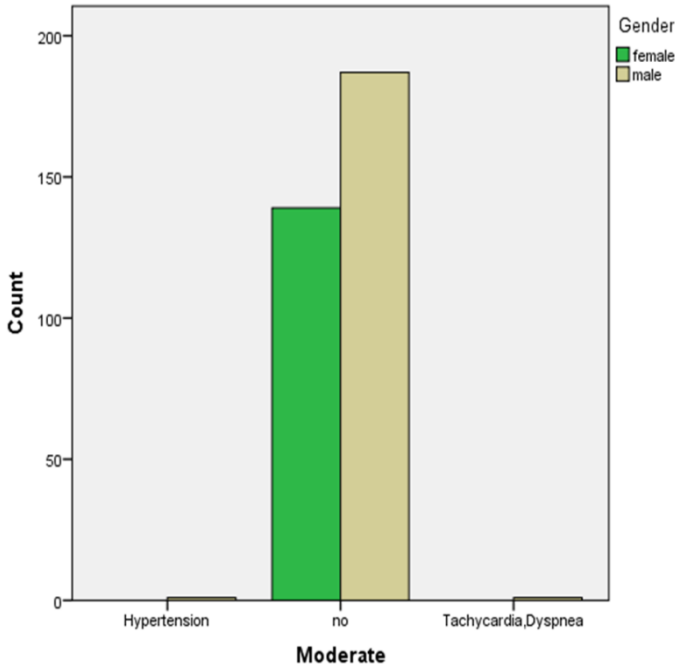

Figure 2. Graph representing the frequency of moderate adverse reactions affecting females and males

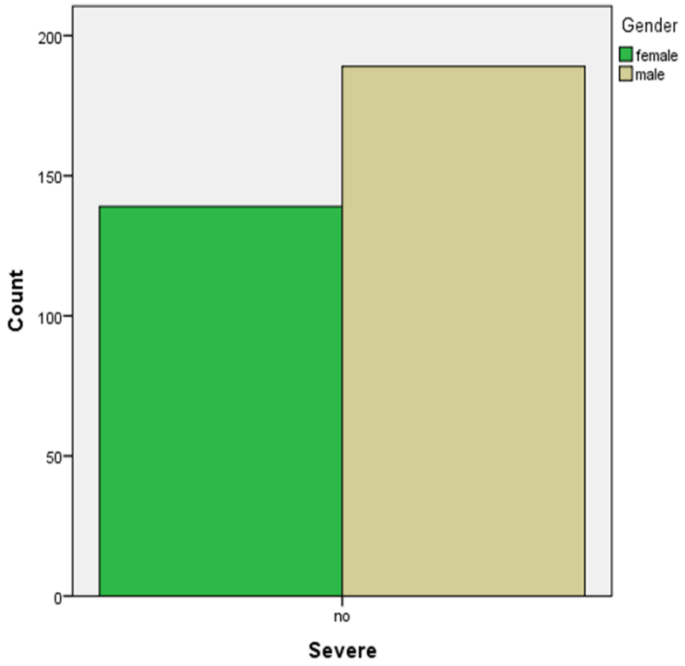

Figure 3. Graph representing the frequency of severe adverse reactions affecting females and males

The frequency and severity of these adverse effects were as follows: 207 (63.11%) mild reactions represented by nausea, sweating, change in taste in an overwhelming majority, two (0.61%) moderate reactions represented by hypertension, tachycardia, and dyspnea. Only one patient who suffered both mild and moderate reactions in combination required to transfer to the urgent care unit. No patients were recorded to have a severe reaction, and none died as a result of an adverse effect. Out of the 209 patients who suffered reactions, 52 had undergone contrast media examination before, 17 patients self-reported prior allergy to contrast media and were affected again, 30 were taking metformin, and 14 were asthmatic (Table 1). Age, EGFR and contrast amount did not show to have any significant impact on the occurring reactions. Table 2 depicts the frequency of acute adverse reactions based on the type of contrast used, administration site and type of examination.

Table 1: Frequency of adverse reactions according to medical history

			no	yes
			Count	Count
Patients that had contrast media before	no	Mild	72	155
		Moderate	226	1
		Severe	227	0
	yes	Mild	49	52
		Moderate	100	1
		Severe	101	0
Patients with a history of contrast media allergy	no	Mild	102	190
		Moderate	291	1
		Severe	292	0
	yes	Mild	19	17
		Moderate	35	1
		Severe	36	0
Patients that take Metformin	no	Mild	102	177
		Moderate	277	2
		Severe	279	0
	yes	Mild	18	30
		Moderate	48	0
		Severe	48	0
	Yes	Mild	1	0
		Moderate	1	0
		Severe	1	0
Patients that are asthmatic	no	Mild	110	193

		Moderate	303	0
		Severe	303	0
	yes	Mild	11	14
		Moderate	23	2
		Severe	25	0

Table 2: Frequency of adverse effects based on technical aspects of a CT examination

		Mild		Moderate		Severe
		no	yes	no	yes	no
		Count	Count	Count	Count	Count
Type of Contrast	Omnipaque	2	10	12	0	12
	Ultravist	119	197	314	2	316
Administration Site	Cubic Fossa	41	73	114	0	114
	Forearm	27	43	69	1	70
	Hand	53	91	143	1	144
Type of Exam	Abdomen	19	37	56	0	56
	Aorta Angiography	0	1	1	0	1
	Brain	33	41	74	0	74
	Brain Angiography	4	7	11	0	11
	Carotid Angiography	2	8	10	0	10
	Chest	40	47	87	0	87
	Chest+Abdomen+Pelvis	7	18	24	1	25
	Head+Neck	5	18	23	0	23
	Lower Limbs Angiography	0	11	11	0	11
	Pelvis	8	7	15	0	15
	Renal Angiography	1	7	7	1	8
	Upper Limbs Angiography	2	5	7	0	7

Discussion

The rate of acute adverse reactions in our study with low-osmolar iodinated contrast media was 63.72 % amongst 328 doses, a substantial drop from the proportion registered with high-osmolar iodinated contrast media[22]. Although less in number, females were affected at a higher percentage than men. There were no severe reactions recorded. In our study, the rate of mortality for the use of low osmolar iodinated contrast agents was 0% which is in accordance with the mortality rate affiliated with the administration of contrast media, reported hitherto[23]. In spite of the fact that no deaths occurred, the possibility of risk should not be ignored, even in patients lacking a medical background of contrast reactions.

It has been proposed that particular characteristics, such as age, EGFR and contrast amount are associated with the rising probability of adverse effects[24], our work did not reaffirm the assumption. The registration of EGFR and amount of contrast administered are a part of our standard screening, but the usefulness of the record remains restricted.

Almost all the adverse effects that took place were mild, though moderate effects occurred at a rate adequate to assert patient assistance and constant monitoring.

This study was limited by certain aspects. Firstly, this study was a cross-sectional one that mandatorily required constant reporting by the imaging technologist. While departmental actions were implemented to promote consciousness about the occurrence of these adverse effects, there was an innate inclination towards precise reporting of more severe episodes. In addition, because this study was conducted in a single center, the generalization of the results is confined. These limitations, though not significant, influenced the results of the study minimally.

The emergence of low-osmolar iodinated contrast media and utilization of pre-treatment regimes have declined the frequency of contrast-associated adverse effects as a whole, but they still persist. While adverse reactions can

be effectively manipulated in the health facility, most of them with observations only, severe effects can constrain immediate treatment and shift to emergency care. Cautious investigations and treatment conventions are needed to avoid morbidity and mortality.

Conclusion

Acute adverse reactions caused by low osmolar non-ionic iodinated contrast agents are primarily mild and transient. In the adult population, moderate reactions are seldom occurring. Females have a higher frequency of acute reactions occurring from low osmolar contrast media than males. In our study, no severe reactions were found, but they do occur rarely and can be life endangering. However, adverse reactions should be accurately documented, treated and managed.

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Treating an Orthodontic Case of Midline Diastema with High Frenal Attachment in Association with Laser Assisted Periodontics and Restorative Procedure

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Abstract
Maxillary midline diastema presents with the compromised aesthetic appearance of an individual which includes spacing in between the maxillary central incisors. Such appearances may worsen with the presence of high attachment of the frenum and small or peg-shaped lateral incisors. In order to address such conditions, multiple approaches may be required. It is important to close the space first and eliminate the cause of abnormal frenum followed by compensating the tooth size discrepancy with suitable restorative material. To achieve such objectives fixed orthodontics or bracket assisted closure of space, laser-assisted frenectomy for the removal of abnormal frenal attachment and composite resin crown build up to attain desirable shape of the tooth has to be employed. With such multidisciplinary practice, an aesthetically sound and pleasing profile was achieved for the patient.

Keywords: Orthodontics, Laser Frenectomy, Composite Resin Restoration

Introduction

Maxillary midline diastema is a condition characterized by the presence of spacing between the two erupted permanent central incisors giving the patient an altered appearance. Some of the major causes for the prevalence of midline diastema is high frenum attachment, problems with the shape of adjacent lateral incisors such as small shaped or peg-shaped lateral incisors not filling the required space in the dentition or absence of lateral incisors and presence of small clefts in the bone.[1] High frenal attachment is characterized into four types namely gingival, musosal, papillary and papilla penetrating. Severe one being papilla penetrating where there is an attachment of the upper border lip tubercle to the palatine papilla. Papilla penetration is a severe attachment problem of the frenum, and subsequently, the cause for midline diastema causing spacing in between the teeth.[2] Midline diastema is characterized as upright, convergent and divergent, and its prevalence is observed mostly in

females. Etiology of midline diastema is of prime importance because it is necessary to get to the root of the problem for better treatment planning.[3]

Fixed orthodontic appliance for correcting midline diastema is better than correction done with removable appliance as there is better control over the crown and root movements and maintaining permanent retention is also possible by orthodontic intervention.[4] Available treatment modalities for correcting a midline diastema associated with a high frenal attachment are frenectomy and frenotomy, the former is the complete removal of the frena and latter involves relocation of the frenal attachment. The process of frenectomy is further divided into modifications such as V-Y plasty, Z plasty and Miller's technique that is performed with surgical scalpel.[5]

Lasers find various applications in the field of dentistry these days and orthodontic treatment facilitated by the use of laser procedures have been gaining momentum over the years.[6] Lasers used in frenectomy procedures are basically semiconductors and their property of approximating the wavelength to the absorption coefficient of the soft tissues such as collagen, haemoglobin, and melanin makes them unique for their usage in the treatment procedures.[7] Laser devices provide increased comfort, better visualization of the area of application and greater precision in areas of its application in dentistry and in periodontics.[8]

Orthodontic intervention and laser periodontal approach to resolve the diastema and high frenal attachment may not be enough. A recent technique for applying composite resins to the tooth surface for its build-up has acquired importance as it resembles the natural tooth structure in terms of shades selection and mechanical and physical properties.[9] Hence, in order to achieve an ideal tooth proportion, restoring the crown part to its natural anatomical measurements is necessary for which composite build-up technique can be employed.

The sole purpose was to employ a multidisciplinary approach to midline diastema by correcting it with orthodontics, laser-assisted frenectomy, and composite resin build-up to attain a sound aesthetic appearance that would not relapse in the future.

Case report

An 18-year-old patient came to a private dental clinical set up in Mumbai, India and desired to get her teeth corrected. At extraoral examination, she presented with competent lips and straight profile with a display of maxillary midline diastema on a smile. On intraoral examination, the patient presented with a midline diastema measuring 3-4 mm with high frenal attachment. The patient also showed the presence of peg-shaped lateral incisors which was a major cause for persisting midline diastema. Fixed orthodontic treatment was started, and midline diastema was closed, and adequate space was made available for composite resin crown build-up, brackets were removed prior to composite resin build up. After the restorative procedure was completed, fixed bonded retainers were given to the patient palatally. Laser-assisted frenectomy was performed. The patient was satisfied with the treatment outcome and overall treatment results (figure 1).

Treatment Progress

Orthodontics: Treatment was started using MBT 0.22" prescription and initial 0.16" Nickel Titanium wires were placed for levelling and aligning of the teeth followed by 17x25" rigid stainless steel wires for the closure of the persisting diastematous space along with an elastomeric chain for incisor space closure. Posterior occlusal settling was done using red elastics prior to starting restorative procedure (figure 2).

Restorative: After creating sufficient amount of spacing between 11 and 12 and between 21 and 22, a treatment plan was the closure of space using direct composite resins on the mesial surfaces of 12 and 22 and distal surfaces of 11 and 21. Minimal tooth preparation was done on the mesial surfaces of 12 and 22 and on distal surfaces of 11 and 21. Cheek retractor was placed, and isolation was done. Polytetrafluoroethylene (Teflon) tape was used to isolate the adjacent teeth. Acid etching was done using EazEtch 37% phosphoric acid. Enamel etched surface was rinsed and dried. Tetric N Bond Universal bonding agent (Ivoclar) was applied and light cured. The restoration was done using A2 shade composite resin by Ivoclar (Tetric N cream bulk fill). Finishing and polishing were performed using (Shofu composite) finishing kit (figure 3).

Periodontics using Laser: Patient was prepared by applying topical anaesthetic gel with small cotton pellets over the frenum. As the patient was still complaining of pain during the procedure, a small amount of local anaesthetic was infiltrated in the vicinity of the frenum. For the laser technique, a diode laser (Sunny, MSI, Bengaluru) with an 808 nm wavelength was used. A 300 μm fibre with an initiated tip at 3W in a continuous mode was used. The tip of the laser was activated outside the oral cavity. For laser-assisted labial frenectomy, the upper lip was pulled upward by the chairside assistant, causing the frenum to tighten. The incision was started with the frenum from the attached gingiva and interdental papilla on the labial surface in a contact mode with a paintbrush stroke between the central incisors extending upward from inner side of upper lip to the depth of vestibule ending in a rhomboidal raw area, separating the fibres from the periosteum (figure 4). Sutures were not placed post the laser treatment.

Treatment Results

Applying orthodontic force corrected the maxillary midline diastema within a shorter period of time, the patient presented with competent lips and improvement in the profile during a smile. Bonded fixed retainers after the closure of space provided for any kind of space opening. The restorative procedure gave an adequate crown shape and size along with matching midlines and matching tooth colour which satisfied the patient. Keeping both the procedures in mind and frenectomy by laser intervention being done, stability was assured towards space opening, attachment of the frenum and overall stability in terms of aesthetics and functional occlusion (figure 1).

Discussion

Maxillary midline diastema necessitates the removal of high frenal attachment either before or after the treatment by fixed orthodontic mechanics and the treatment of which is followed by permanent retention plan in order to prevent the opening up of the spaces that are closed. Such a multidisciplinary approach provides good stability and better treatment outcome.[10]

Tissue changes take place when the infrared laser radiant energy in the range of 980 nm is converted to heat energy causing incision, coagulation to vaporization and mainly has an affinity towards haemoglobin and dark pigments which contributes to their thermal outcome. Homeostasis is seen when an infrared laser light diode at a particular wavelength induces thermal injury to the target tissue with a laser tip that moves gradually over the tissues providing a cut and the depth of which depends upon the power and duration of time for which the contact is made. Use of lasers has gained popularity as other treatment protocols have become less important when it comes to conditions of tissue ablation, sterilization, and homeostasis. The laser with its coagulating effects blocks the small sensory nerve endings and provides with the much needed homeostatic and anaesthetic effects. The term coagulation is important in laser surgery as it produces the desired homeostasis by approximating the edges of the wound and vessel wall contraction. With such properties of laser frenectomies being done, the need for placing sutures have also been minimized. Advantages of lasers for frenectomy includes no bleeding, good acceptance by the patient, minimal discomfort post surgically. Reduced inflammatory reaction and edema grounds less pain and irritation and less use of drugs postsurgically.[11]

Addressing the tooth size and shape problems are also important as full-fledged treatment by orthodontics may not address all the problems efficiently and is also an option that is unappealing to most of the patients. Composite resin restorations in combination with orthodontics offer a more conservative and economical method to solve problems of midline diastema.[12]

Laser frenectomy: In a case report by Kamble A et al., a successful treatment for the correction of high labial frenum was performed using Er, Cr: YSGG (Waterlase MD biolase technology, Ervin, CA, USA): 2.25 W of power supply, 30% water flow and 30% air flow, 600 μm diameter of optical fibre tip (G6) at 20 Hz) laser and the treatment outcome was effective as it was a lesser amount of expense and time consumption and was convenient to the patient and overall proved to be a minimally invasive and highly effective method of correcting midline diastema.[13] According to another case report by Sukumar Singh N et al, a diode laser having a wavelength of 810-900 nm of CO_2, Nd: YAG, Argon, Er:YAG and diode laser with a power supply of 1W has a

significant effect on the frenal tissue removal and proved to be a useful method when compared to the conventional tissue removal method using a blade.[14]

Orthodontic treatment: In a case report by Nubesh Khan S et al, in two different patients who were treated by orthodontics and laser frenectomy by using diode laser with a wavelength of 980 nm, 3W power and 400 µm optical fibre with the idea that minimum power exposure and accurate wavelength together can be utilized for performing effective frenectomy in orthodontic patients despite the involvement of metal brackets.[15] In another article by Eduardo F S et al., high-intensity laser therapy was provided for frenectomy procedures having a laser setting of 1.6 W and was expected not to be used in close proximity to the bone as there might be chances of heat-related damage to the vital structures.[16]

Composite resin restoration for a case of midline diastema and laser frenectomy: In a case report by Utpal kumar Das et al., frenectomy was performed in a patient with a diode laser having a wavelength of 980 nm, 3W power, and 32 micron quartz optical fibre. A combination of laser-based frenectomy and composite restoration solved the problem of midline diastema.[17] In a report by Sucheta S, laser frenectomy was performed using a 400 µm fibre of diode laser 980 nm and 2.5 W and later restored the spaces using a combination of zirconia crown and composite resin buildup.[18]

Hence, according to the above findings, we can conclude that laser frenectomy is a reliable technique for correcting cases of midline diastema combined with orthodontics and composite resin build up.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or other, exists.

FIGURES

FIGURE 1: PRE AND POST TREATMENT PHOTOGRAPHS SHOWING PRESENCE OF MIDLINE DIASTEMA AND AFTER CORRECTION OF DIASTEMA

FIGURE 2: BEFORE AND AFTER THE CLOSURE OF MIDLINE DIASTEMA AND SETTLING ELASTICS

FIGURE 3: BEFORE AND AFTER THE CLOSURE OF MIDLINE DIASTEMA WITH COMPOSITE RESIN RESTORATION

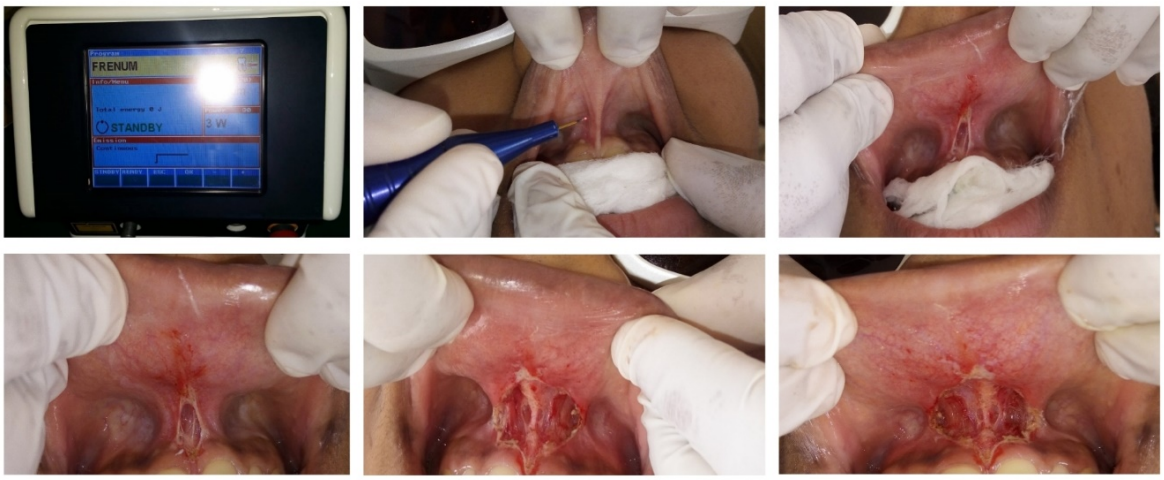

FIGURE 4: LASER FRENECTOMY PROCEDURE AS PERFORMED IN STEPWISE MANNER FROM SETTING THE PARAMETERS TO INITIAL AND FINAL INCISION

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Status of Mental Health Among Left Behind Wives of Migrant Workers in North-East Part of Bangladesh

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Abstract

Introduction: Left behind spouses of outmigrants are vulnerable to suffer from anxiety and depression. This study was performed to see the prevalence of anxiety and depression among left behind wives of migrant workers attending gastroenterology outpatient department (OPD). Material and Method: This cross-sectional study was done in Gastroenterology OPD North East Medical College, Sylhet, Bangladesh from January 01 to December 31, 2018. 275 Consecutive patients, ie, wives of migrant workers of sylhet and adjacent districts attending of North East Medical College, Sylhet were included. Socio-demographic and clinical evaluation data was recorded. Then their mental health status regarding anxiety and depression were assessed using the Hospital Anxiety-depression Scale (HAD scale) under the supervision of a senior psychiatrist. Score 1-7 was taken as normal, 8-10 as borderline and above 10 was taken as confirming cases of anxiety and depression. Statistical analysis was done using SPSS version 20 and chi-square test was done to see the difference and P value <0.05 was taken as significant. Result: Out of 275 left behind wives of migrant workers, age varying from 18-50 (mean 30.47). Of them, 247 (88.36%) were from rural family, and 273 (99.27%) were housewives. Among them, 90 (32.72%) had symptom score consistent with anxiety. Depression was found among 78 (28.36%) participants while combined anxiety and depression was found among 54 (19.63%). Anxiety and depression were found to be more prevalent among wives of Higher age group, with longer duration of married life, residing in rural areas, with lower economic and educational background. Conclusion: Anxiety and depression were found in about one-third of left behind wives of migrant workers attending gastroenterology OPD. Both anxiety and depression were found more prevalent among those older age group, with longer duration of married life, member of the rural family, having a lower economic and educational background.

Keywords: Left Behind Wives, Migrant Workers, Anxiety and Depression, Mental Health Status

Introduction:

Migration for economic reason is very common in this modern era with the hope of improvement of economic condition[1]. Although this migration is giving economic benefit to the country and their families. However, the

adverse and unfavourable effect on the mental health of these workers and left behind family members are becoming evident and reported from Srilanka and Pakistan [2,3]. An Indonesian report survey between 1993-2007 regarding psychosocial consequences of out-migration, which showed that the left behind spouses is more prone to suffer from a stress-related disorder like hypertension and depression[4]. Several studies suggest that stressful life events trigger episodes of depression[5]. Reports from developing countries show that aging parents of migrant workers are additionally tasked with caring for grandchildren of left behind family precipitating increase health problems[6]. Studies also show that spouses of out-migrants have increased physical and mental health problems including depression[7]. In case of overseas migration, wives of migrants feel temporary loss because of separation, loneliness, insecurity, feelings of anxiety because of a communication gap with their husbands, the problem in children's upbringing and extra workload and become vulnerable to develop symptoms of depression, anxiety, and stess[8,9]. Studies on Filipino wives[10] and Gulf wives in India[11] showed increased numbers of stress-related symptoms. A study from Pakistan reports a negative impact on children and left behind spouses of migrant workers[12].

Like other developing countries, people from Bangladesh are also migrating abroad for the economic cause. In 2014, 4,26,000 people migrated from our country to work in another country[13], of them about 83% were male. In 2018, up to April, about 273,304 workers left our country as migrant workers mostly on temporary labour contact. Remittance from these workers constitutes more than nine percent of the country's GDP[14]. Almost all of this worker in our country leave their families behind and support them financially.

But there is no report regarding the mental health of left behind spouses in our country. With this background, this study was designed to see the prevalence of mental health disorder namely anxiety and depression among left behind wives of Bangladeshi migrant workers attending gastroenterology outpatients department in a tertiary centre in Sylhet, Bangladesh.

Material and method:

This was a cross-sectional study done in North East Medical College, Sylhet, Bangladesh from January 01 to December 31, 2018, within a period of one year. 275 Consecutive patients, i.e. wives of migrant workers, attending gastroenterology OPD were included in this study. After taking informed written consent, socio-demographic data, presenting symptoms, clinical and laboratory evaluation reports were recorded on a predesigned data sheet. Mental health status regarding anxiety and depression were assessed using the Hospital Anxiety-depression scale(HAD scale) [15] under the supervision of a senior psychiatrist. Score 1-7 was taken as normal, 8-10 as borderline and above 10 were taken as confirmed cases of anxiety or depression. Statistical analysis was done using SPSS version 20. Chi-square test was done to see the differences and P value <0.05 was taken as significant.

Result:

The present study included 275 left behind wives of migrant workers of Sylhet division. Age of them varied from 18 years to 50 years (mean 30.47 and SD 6.74) of them 247 (88.36%) and 273 (99.27%) were from rural family and housewives respectively. Among them, 197 (60.73%) had more than two physical symptoms leading them seeking consultation for health care. According to HAD scale, 90 (32.72%) of them had symptoms consistent of anxiety. Anxiety was more prevalent among age 36 years and above group (48.14%), and among those who were from rural family (33.33%). The highest prevalence of anxiety symptoms was found among them the whose duration of married time more than 15 years(39.47%) followed by 11-15 years group 35.29% and then up to five years (32.85%). Prevalence of anxiety symptoms were more among women with lower education level than that of higher education level (36.419% vs. 27.43% and women of poor and middle-class economic group than those of higher economic group (33.46% vs22.22%) . in this study 72 (31.55%) women living in in-laws house had symptoms consistent with anxiety while 19 (38.0%) women residing in fathers house had anxiety.

In this study, 78(28.363%) women were found to have symptoms score consistently of depression and prevalence was highest among 36- 45 years age group 35.18%) and followed by up to 25 years age group (27.27%) and 26-35 years age group (26.62%). Prevalence of depression was 30.45% and 12.5% among women

of rural and urban origin respectively, and the difference was significant (<p=0.1). Prevalence of depression was found directly related with the duration of married time. It was found 35.52%, 29.41%, 26.92% and 21.428% among women married for more than 15 years group, 11-15 years, 6-10 years and up to five years group respectively and p value was 0.023. Prevalence of depression was significantly higher among women with educational level primary and below than those with SSC and above (37.65% vs. 15.04% with p value <0.01). Women from poor and middle-class families were found suffering from depression than the rich group (29.96% vs. 5.55%and p value <0.01). Depression was more prevalent among Women having more than two physical symptoms than those having one or two symptoms (30.96% and 21.79% with p value 0.034). In this series, depressive symptoms were found among 64 (28.44%) and 14(28%) women residing in in-laws' house and fathers house respectively. Combined anxiety and depression were found among 54 (19.63%) in this study.

Univariate logistic regression analyses with various factors with anxiety and depression presented in table 2 & 3. Multivariate analysis showed that left behind wives living in a rural area and having age more than 36 yrs are 2 times more vulnerable to develop anxiety than their counterparts(table 4). In multivariate logistic regression left behind wives living in a rural area, having lower economic condition and lower education levels are two times more vulnerable to develop depression(table 5).

Discussion:

In our study prevalence of anxiety among left behind wives was higher than that of depression. But the prevalence of depression reported from Pakistan was higher than that of anxiety[16]. The difference in social situation and the inclusion of a specific group of patients may be the cause of this difference. This study reveals that the prevalence of anxiety and depression were higher among left behind wives with a higher age group. This may be explained as with aging they have to face different types of family events, increased responsibility of children education and guidance and also having age-related physical problems. All these may be a stressor for them and may affect their mental health. In addition to aging awareness of husbands' health and safety abroad also increases. In multivariate analysis subjects having age, more than 36 years were found two times more vulnerable to anxiety than their counterparts. Our study found a higher prevalence of anxiety and a significantly higher prevalence of depression with increasing duration of married life. This can be explained as stressful life events like loneliness, extra responsibility and emotional stress due to enforced separation precipitated mental health related disorder especially depressive disorder[12]. But in multivariate analysis increasing duration of married life was not found an important predictor of anxiety or depression.

In this series, the prevalence of depression was significantly higher among wives of lower and middle-class families, wives from rural families and among those with a lower level of education. In multivariate analysis, this above mentioned two factors along with lower education level also found as independent predictors of depression in the left behind wives. This can be explained as most of the rural migrants were from the relatively lower economic group and unskilled, had to make debt before migration and involved in jobs with lower income. Wives of them have to repay that debt from their low and sometimes irregularly sent remittance. Wives of the rural community are mostly housewives, and they have no extra source of income. Lack of opportunity to have a job in rural areas and lower educational states make them more vulnerable to stress-related disorders. In this series, anxiety was more prevalent among rural women with lower economic and educational background[17]. This study also reveals that a number of physical symptoms were higher among those having anxiety and significantly higher among those suffering from depression. It is consistent with an earlier report which concluded that left behind wives of overseas migrant have increased rate of physical and mental health problems including depression[7]. Other studies show that nonworking left behind wives has more chance of depression as compared to working women[18,19,20]. As almost all respondent in our study were housewives, no good correlation and conclusion could be made in this regards. In our study 50 (18.18%) women are found to live in fathers' house, and 225(81.82%) live in in-laws house. And the prevalence of anxiety and depression among both groups do not differ significantly. But other studies show a higher prevalence of depression among those residing in a joint family (in in-laws family). This can be explained as this study includes a specific group of women with small sample size.

Table 1: Prevalence of anxiety and depression in different categories

	Anxiety				Depression			
	Normal (%)	Borderline (%)	Confirmed (%)	P value	Normal (%)	Borderline (%)	Confirmed (%)	P value
Age Category								
Up to 25 years (n=77)	38(49.35)	16(20.77)	23(29.87)	0.107	44(57.14	12(15.58)	21(27.27	
26-35 years (n=139)	61(43.88)	39(28.05)	39(28.05)		69(49.64)	33(23.74)	37(26.62)	0.323
36-45 years (n=54)	16(29.62)	12(22.22)	26(48.14		20(37.04)	15(27.77)	19(35.18)	
>45 years (n=5)	1(20.0)	2(40.0)	2(40.0		2(40.0)	2(40.0)	01(20.0)	
Residence								
Rural (n=243)	97(39.91)	62(25.51)	84(33.33)	0.089	111(45.68)	58(23.868)	74(30.45)	0.007
Urban(n=32)	19(59.37)	7(21.87)	6(18.75)		24(75.0)	4(12.5)	4(12.5)	
Occupation								
Housewife (n=273)	116 (42.49)	68(24.90)	83(32.60)	0.088	134(49.08)	62(22.71)	77(28.205)	0.675
Service (n=2)	0	1(50.0)	1(50.0)		1(50.0)	0	1(50.0)	
Married for								
Up to 5y (n=70)	36(51.42	11(15.71)	23(32.85)		46(65.71)	9(12.57)	15(21.428	
6-10 y(n=78)	38(34.71)	21(26.92)	19(24.35		39(50.0)	18(23.076)	21(26.92	0.023
11-15y(n=51)	18(35.29	15(29.41	18(35.29		19(37.25)	17(33.33)	15(29.41)	
>15 y(n=76)	24(31.57	22(28.94	30(39.47		31(40.79)	18(23.68)	27(35.526)	
Education								
≤primary (n=162)	59(36.42)	44(27.16	59(36.41	0.067	61(37.65)	40(24.69)	61(37.65)	0.000
>above (n=113)	57(50.44	25(22.12	31(27.43		74(65.486)	22(19.469)	17(15.04)	
Economic condition								
Poor(n=10)	2(20.0)	2(20.0)	6(60.0)	0.288	1(10.0)	1(10.0)	8(80.0)	
Middle class (n=247)	104(42.11	63(25.5	80(32.88		119(48.178	59(23.88)	69(27.93)	0.000
Rich(n=18)	10(55.55)	4(22.22)	4(22.22		15(83.33)	2(11.11)	1(5.55)	
Number of symptoms								
≤2(n=78)	36(46.15)	21(26.92	21(26.92)	0.433	48(61.54)	13(16.66)	17(21.79)	0.034
>2 (n=197)	80(40.61	48(24.36)	69(35.02		87(44.16)	49(24.87)	61(30.96)	
Staying at house of								
In-laws (n=225)	91(40.44	63(28.0	71(31.55)	0.061	107(47.55)	54(24.0	64(28.44)	0.415
Father (n=50)	25 (50.0)	6 (12.0)	19 (38.0)		28(56.0)	8(16.0)	14(28.0)	

Table 2. Univariate analyses to show the association of various factors with anxiety in left behind wives.

	Significance	**OR**	**95% confidence interval**
Rural residence	.080	2.289	.907-5.780
Age more than 36 years	.019	2.069	1.126-3.801
Lower level of education	.119	1.515	.898-2.555
Lower economic condition	.331	1.760	.562-5.509
Married life more than 15 years	.012	1.956	1.156-3.309
More than 2 symptoms	.198	1.463	.820-2.612

Table 3. Univariate analyses to show the association of various factors with depression in left behind wives.

	Significance	**OR**	**95% confidence interval**
Rural residence	.082	2.411	.894-6.503
Age more than 36 years	.273	1.424	757-2.678
Lower level of education	.000	2.988	1.662-5.372
Lower economic condition	.101	3.486	.783-15.527
Married life more than 15 years	.035	1.789	1.043-3.071
More than 2 symptoms	.096	1.687	.912-3.121

Table 4. Multivariate analysis showing the association of various factors with anxiety in left behind spouses

	Sig.	OR	95.0% C.I.for EXP(B)	
			Lower	Upper
Rural residence	.127	2.093	.811	5.402
Education below primary	.322	1.324	.760	2.306
Poor & middle class	.580	1.404	.423	4.662
More than 2 symptoms	.309	1.362	.751	2.469
Married life >15yrs	.763	.881	.386	2.009
Age more than 36yrs	.076	2.248	.920	5.494

Table 5 : Multivariate analysis showing the association of various factors with depression in left behind wives

	Sig.	OR	95.0% C.I.for EXP(B)	
			Lower	Upper
Rural residence	.209	1.929	.692	5.375
Education level primary or below	.003	2.534	1.375	4.671
Poor & middle class	.406	1.931	.409	9.126
More than 2 symptoms	.173	1.558	.823	2.947
Married life > 15 years	.498	1.332	.582	3.052
Age more than 36 years	.869	1.081	.430	2.717

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Overview of Kawasaki Disease in Albaha Area, Saudi Arabia

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Abstract

Background: Kawasaki disease (KD), an acute, febrile, self-limiting vasculitis of unknown etiology, is a disease that predominantly affects medium- and small-sized arteries of infants and preschool children. Objectives: This study aimed to evaluate the presentation and clinical course, diagnosis, management, outcomes, and complications of KD, as well as the presence of abnormal laboratory values therein, among children admitted to King Fahad Hospital, Albaha, Saudi Arabia. Methods: This observational, hospital-based retrospective cohort study was conducted at the Department of Pediatrics and Neonatology, King Fahad Hospital Albaha, from 2008 to 2018. Those with both complete and incomplete KD were considered. The diagnostic criteria for KD were based on the European and American Heart Association recommendations. Results: The prevalence of KD in Albaha area was 0.6%. It was more common among in male patients (60%) than in female patients (40%). 85% of patients satisfied the diagnostic criteria for complete KD. Among the cases included, 60% were diagnosed during winter and spring. Cardiac abnormalities confirmed through echocardiography were documented in 22.5% of the patients. Abnormal laboratory results were significantly common among those with incomplete KD. Conclusion: Majority of patients fulfilled diagnostic criteria of complete KD, and the presence of coronary artery abnormalities consisted with other international published studies. All patients successfully completely recovered during follow-up, and no mortality was documented.

Keywords: Kawasaki Disease, Infants, Young Children

Abbreviations: KD; Kawasaki Disease. Pts; patients. N; number. CI; Confidence Interval. ESR, erythrocyte sedimentation rate. WBC, white blood cell count. PLTS, platelets. ALT, Alanine Amonitransferase. M; male. F; female. AST; Aspartate Amonitransferase. CI; Confidence Interval. BSA; body surface area. LMCA; left main coronary artery. LAD; left anterior descending. RCA; right coronary artery. CI; confidence interval.

Introduction

Kawasaki disease (KD) has been described as vasculitis of unknown etiology commonly affecting the medium- and small-sized arteries of infants and children of preschool age **[1].** Moreover, first reports of KD were shown in Japan with incidence rates, 264/100,000 individuals, United States and European countries having an

incidence rate of 20.8/100,000 and 8/100,000 individuals, respectively [1-2]. Genetic contributions, familial associations, environmental factors, and infectious diseases, such as novel RNA virus and corona viruses, bacteria, fungi, and house mites, have been associated with KD **[1-2-3].** Given that no definitive diagnostic test can confirm KD, diagnostic guidelines established by American Heart Association (AHA) have been used. Accordingly, complete KD is characterized by the presence of fever lasting ≥5 days with at least four of the following five principal clinical features: (1) bilateral conjunctival injection, (2) cervical lymphadenopathy, (3) polymorphous skin rash, (4) lip or oral mucosa changes, and (5) distal extremity changes **[1].** The presence of coronary artery abnormalities may also confirm the diagnosis. Moreover, many complications, such as, neurological, hematological, renal, and gastrointestinal symptoms, have been associated with the disease **[1-4-5].** On the other hand, incomplete KD is characterized by fever with <4 of the principal clinical features, as well as positive laboratory results or coronary artery abnormalities detected through echocardiography **[1-6].** Abnormal laboratory parameters in patients with KD include leukocytosis, thrombocytosis, elevated erythrocyte sedimentation rate (ESR), elevated C-reactive protein (CRP) level, elevated transaminase level, and hypoalbuminemia **[1-2-7].** KD has also been considered to be a significant cause of acquired heart disease among children. N-terminal pro-brain natriuretic peptide helps diagnose KD in patients with undifferentiated febrile illness given that it can confirm hematological complications, such as hemophagocytic syndrome and macrophage activation syndrome **[2-8].** Early intravenous immunoglobulin (IVIG) and aspirin have been considered the treatment of choice for both complete and incomplete KD **[1-2-9].** However, early treatment with corticosteroids, which has been shown to reduce the risk of serious heart problems in children aged <5 years**,** can be used for high-risk cases **[10-11].** Furthermore, the successful use of infliximab, a monoclonal antibody that binds with high affinity to TNF-α and has been approved for pediatric patients, has been shown in highly resistant KD cases **[12-13].**

Objectives

Considering that no study regarding KD has ever been conducted in Albaha, Saudi Arabia, the present study sought to evaluate the clinical course, diagnosis, management, and complications of KD in children with KD admitted to King Fahad Hospital, Albaha. Moreover, laboratory tests, as well as complete and incomplete diagnoses of KD, were also assessed in these children.

Methods

This observational, hospital-based retrospective cohort study was conducted at the Department of Pediatrics and Neonatology, King Fahad Hospital, Albaha, Saudi Arabia. The study was approved by the research and ethics committee of the hospital. From January 2008 to December 2018, 40 children diagnosed with KD and admitted to our hospital were included in this study, and their medical records were retrospectively reviewed. Diagnostic guidelines established by American Heart Association (AHA) have been used**.** Accordingly, complete KD is characterized by the presence of fever lasting ≥5 days with at least four of the following five principal clinical features: (1) bilateral and non purulent conjunctivitis, (2) cervical lymphadenopathy > 1.5 cm, (3) polymorphous skin rash, (4) lip or oral mucosa changes, and (5) distal extremity changes **[1].** In some patients, the diagnosis was confirmed despite only 3 or 4 days of fever, provided that classic clinical presentations were observed. Incomplete KD was considered in any infant or child having prolonged unexplained fever and <4 of the aforementioned clinical features with associated abnormal laboratory results or coronary artery abnormalities detected through echocardiography **[1-2-3].** Arthritis or arthralgia, gastrointestinal symptoms, respiratory symptoms, central nervous system findings, and coronary artery abnormalities were recorded as associated clinical findings for all patients. The following laboratory parameters were recorded for the diagnoses of KD: white blood cell count (WBC) > 15,000/mm^3, ESR > 40 mm/h, serum CRP > 3 g/dL, platelet count ≥ 450,000 after 7 days of fever, albumin levels < 25 g/dL, urine WBC count ≥ 10 WBC/hpf, and high Alanine and Aspartate transaminase levels **[1-2-3].** Echocardiography was performed when KD was suspected, during which the coronary arteries were imaged and quantitative assessment of luminal dimensions was done. Coronary artery abnormalities were staged according to the following AHA recommendations [2]: grade I, no coronary changes at any stage of the illness; grade II, transient ectasia resolving within the first 6–8 weeks; grade III, small–medium coronary artery aneurysm; grade IV, ≥1 large or giant coronary artery aneurysms or multiple aneurysms in the same coronary artery; and grade V, coronary artery obstruction. A Z score of <2 indicated no involvement, 2–2.5 indicated dilation only, ≥2.5 to <5 indicated small aneurysms, ≥5 to <10 (or absolute dimension < 8 mm)

indicated medium aneurysms, and ≥10 (or absolute dimension > 8 mm) indicated large or giant aneurysms. Z scores were adjusted for body surface and were considered abnormal when values were >2.5 [1-2]. Echocardiography was repeated 2 weeks into the treatment and 4–6 weeks thereafter and more frequently in patients determined to have coronary artery abnormalities during the acute illness. Based on our protocol, high-dose IVIG (2 g/kg) was administered as a single intravenous infusion over 10–12 h within 10 days of illness onset and as soon as possible after diagnosis, as well as after the 10th day of illness provided that the fever persisted without any other explanation or with coronary artery abnormalities and laboratory parameters abnormalities. Aspirin (80–100 mg/kg/day) was administered with IVIG till the patient remained a febrile for 48–72h, after which the dose was decreased to 3–5 mg/kg/day as prophylactic treatment for 4–6 weeks [1-2-9]. None of the patients received prednisolone or other medications. P value, Confidence Interval, and statistical analysis was conducted using SPSS version 17.

Results

As presented in Tables 1 and 2, nearly 85% of the patients were aged <5 years, while 15% were aged >5 years (P = 0.06). Moreover, 24 patients (60%) were male and 16 (40%) were female (P = 0.18). All children had fever lasting for >5 days. With regard to the five cardinal clinical signs, oral mucosa or lip changes was predominant (95%), followed by cervical lymphadenopathy (92.5%), polymorphous skin rash (90%), conjunctivitis (90%), and distal extremity changes (85%). Gastrointestinal symptoms, one of the associated clinical findings, were observed in 70% of the patients. Cardiac abnormalities (Table 3) were confirmed in nine patients (22.5%), while normal coronaries were observed in 31 (77.5%) (P = 0.07). Moreover, all patients suffering from coronary abnormal had coronary artery dilation categorized as stage II with Z scores between 5 and 10. The highest percentage of cardiac impairment was observed within the first 2 years (55%), with no significant differences between males and females (P = 0.45). Other common associated clinical findings included arthralgia (45%), hepatic dysfunction, and respiratory symptoms (37%). The abnormal laboratory findings were as follows: elevated WBC (75%), elevated ESR (95%), elevated platelet count (70%), and elevated CRP (60%). Anemia was observed in 45% of the patients, while 25% had low albumin (Table 2). Moreover, 34 patients (85%) satisfied the criteria for complete KD, with the remaining 6 (15%) having incomplete KD (P = 0.06). Among the included patients, 13 (32.5%) were diagnosed during summer, 11 (27.5%) during spring, 10 (25%) during autumn, and 13 (32.5%) during winter, 95% CI (7.11–12.8). All patients were administered IVIG immediately after confirming the diagnosis, with responses to treatment being excellent. All patients suffering from cardiac abnormalities successfully completely recovered during follow-up.

Table 1. Distribution of patients diagnosed as Kawasaki disease in this study.

Age, month	PTs n = 40		Male = 24 (60%)	Female=16 40%	Complete KD n = 34 (85%)	Incomplete KD n = 6 (15%)	Normal heart n = 31 (77.5%)	Abnormal coronaries n = 9 (22.5%)
5–12	12	(30%)	7	5	10	2	7 (M 4, F 3)	5 (M 3, F 2)
13–24	10	(25%)	6	4	7	3	8 (M 5, F 3)	2 (M, F 1)
25–36	4	(10%)	3	1	4	0	4 (M 3, F 1)	0
37–48	5	(12.5%)	3	2	4	1	5 (M 3, F 2)	0
49–60	2	(5%)	1	1	2	0	1 (M)	1 (F)
61–72	2	(5%)	1	1	2	0	2 (M 1, F 1)	0
73–84	2	(5%)	1	1	2	0	2 (M 1, F 1)	0
85–96	3	(7.5%)	2	1	3	0	2 (M 1, F 1)	1 (M)
95% CI	(2.3-7.7)		(1.3-4.6)	(0.9-3.1)	(2.3-6.2)	(-0.06- 1.8)	(2.1–5.6)	(-0.07-2.3)
82.5% of cases were diagnosed at age ≤ 5 years and 17.5% at age ≥ 5 years.								
Winter 13 (32.5%), Spring 11 (27.5%), Autumn 10 (25%), Summer 6 (15%). 95% CI (7.11-12.8)								
PTs: patients. KD; Kawasaki Disease. N; number. CI; Confidence Interval. M; male. F; female.								

Table 2. Distribution of Clinical and Laboratory findings in Kawasaki disease.

Clinical findings			Laboratory findings		
Oral findings	95%	38	Elevated ESR ≥ 40	38	95%
Cervical lymphadenopathy	92.5%	37	Elevated WBC ≥ 15000	30	75%
Non purulent conjunctivitis	90%	36	Elevated PLTS ≥ 40000	26	65%
Skin rash	90%	36	Positive CRP	24	60%
Extremity changes	85%	34	Low Albumin ≤3 g/dL	10	25%
Gastrointestinal	70%	28	Elevated ALT ≥ 45	15	37.5%
Respiratory	25%	10	Elevated AST ≥ 45	12	30%
Cardiovascular	22.5%	9	Urine ≥ 10 WBC/f	10	25%
95% CI	(20.1–36.9)		95% CI	(13.4–27.9)	

Abbreviations: ESR, erythrocyte sedimentation rate; WBC, white blood cell count; PLTS, platelets; ALT, Alanine Amonitransferase; AST, Aspartate Amonitransferase. CI; Confidence Interval.

Table 3. Patient diagnosed Kawasaki Disease with coronary artery abnormalities, normal ranges and Z scores.

Age/ BSA	LMCA mm	Z score	LAD mm	Z score	RCA mm	Z score
6 months 0.34 cm^2	4 (1.87–2.46)	5.8	3.4 (1.46–1.81)	8	3.2 (1.43–1.91)	6
7 months 0.37 cm^2	3.9 (1.93–2.52)	5.4	3.6 (1.50–1.87)	9	3.3 (1.48–1.97)	6.2
8 months 0.41 cm^2	4 (2.01–2.61)	5.2	3.5 (1.57–1.95)	8.2	3.2 (1.55–2.05)	5
9 months 0.42 cm^2	4.4 (2.04–2.65)	5.2	3.7 (1.60–1.98)	9	3.4 (1.58–2.09)	5.7
12 months 0.46 cm^2	4.5 (2.21–2.73)	6.2	4 (1.66–2.05)	9.5	4 (1.64–2.16)	7.2
18 months 0.50 cm^2	4.2 (2.21–2.84)	5.4 5.3	3.9 (1.74–2.15)	8.8	3.9 (1.72–2.26)	6.6
18 months 0.50 cm^2	4.2 (2.18–2.81)	5.4	37 (1.72–2.13)	8	3.4 (1.64–2.16)	5.3
24 months 0.53 cm^2	4.4 (2.24–2.88)	5.6	3.9 (1.77–2.19)	8.4	3.6 (1.75–2.29)	5.7
60 months 0.74 cm^2	5 (2.56–3.25)	5.8	4.5 (2.05–2.53)	8.2	3 (2.04–2.64)	2.6
95% CI	4 - 4.57		3.58 - 4		3.22 – 3.66	

BSA; body surface area. LMCA; left main coronary artery. LAD; left anterior descending. RCA; right coronary artery. CI; confidence interval.

Discussion

Although epidemiological data regarding KD suggest an increase in its incidence worldwide, no study has been published on the incidence or prevalence of KD in Albaha area, Saudi Arabia. Accordingly, the present study showed the prevalence was 0.6%, and 60% of them was < 5 yr. Among the 40 children included herein, 6 (15%) had incomplete KD, which is consistent with the results of other studies **[1-2-3-6].** Using published AHA guidelines, including supplementary laboratory criteria, together with echocardiography may lead to better recognition of KD **[1].** Accordingly 85% patients satisfied the criteria for complete KD, with the remaining 15% having incomplete KD (P = 0.06). 22.5% of patients showed coronary artery abnormalities, and was diagnosed insignificantly more frequent in male patients (P = 0.47), albeit not significantly, as documented in published findings **[16].** Among the included patients, 13 (32.5%) were diagnosed during summer, 11 (27.5%) during spring, 10 (25%) during autumn, and 13 (32.5%) during winter, [95% CI (7.11–12.8)]. Consistent with other previous data, we found that complete and incomplete KD was more common among children below 1 year [6-14], and insignificantly was higher in male pts (p = 0.49) **[1-6-15].** In the present study, changes in the oral mucosa or lips (95%) were predominant, followed by polymorphous skin rashes (90%), which is consistent with

other studies [16-17]. Several previous studies have also reported significantly less conjunctivitis, changes in extremities, and cervical lymphadenopathy among patients with incomplete KD [6-14]. However, the present study observed higher rates of the aforementioned changes among those with incomplete KD. Gastrointestinal symptoms (7%), such as abdominal pain, vomiting, and diarrhea, and arthralgia (50%) were common non classical signs observed herein, a finding consistent with those in worldwide studies [4-14]. Moreover, among the nine (22.5%) patients with cardiovascular complications observed herein, five had complete KD and four had incomplete KD, which was not consistent with other published studies wherein incomplete KD was found to be associated with higher risk of developing coronary abnormalities [2-6]. All children with cardiovascular complications who received IVIG experienced complete recovery of coronary artery abnormalities. Furthermore, abnormal laboratory results observed herein coincided with those published previously [1-14-17] and were able to accurately reflect the severity of the disease.

One limitation of the present study is the considerably small sample size. As such, the findings should be considered no conclusive.

Conclusions

In conclusion, KD was more common in children less than 5 years, complete KD was diagnosed more frequently than incomplete, and in male patients more than in female patients. Moreover, most of the cases were diagnosed during winter and spring. Cervical lymphadenopathy and changes in distal extremities, as well as abnormal laboratory results, were significantly more common among those with complete KD than those with incomplete KD. All patients responded remarkably to treatment with IVIG and aspirin.

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