T.C.
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KNOWLEDGE, ATTITUDE AND PRACTICE OF COMMUNITY PHARMACISTS IN MATERNAL AND CHILD HEALTH SERVICES

MASTER THESIS

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APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated 19/04/2022 and numbered 202204Y0231

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DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

Date: 01/06/2023

Signature

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LIST OF SYMBOLS AND ABBREVIATIONS

UN	: United Nations
SDGs	: Sustainable Development Goals
WHO	: World Health Organization
MCH	: Maternal and Child Health
WCC	: Well-child care
VPDs	: Vaccine-preventable diseases (VPDs)
MMR	: Maternal mortality ratio (MMR)
UNICEF	: United Nations International Children's Emergency Fund (UNICEF)
MDG 4	: Millennium Development Goal 4 (MDG 4)
ENAP	: Every Newborn Action Plan (ENAP)
EPMM	: Ending Preventable Maternal Mortality (EPMM)
ARR	: Annual Rate of Reduction (ARR)
US	: United States (US)
FIP	: International Pharmaceutical Federation (FIP):
CI	: Confidence intervals (CI)
OR	: Odds ratios (OR)
PHC	: Primary Health Care (PHC)
OTC	: Over-the-counter (OTC)
EMR	: Eastern Mediterranean Region (EMR)
SRH	: Sexual and Reproductive Health (SRH)
KAP	: Knowledge, Attitude and Practice (KAP)
PCA	: Principal component analysis (PCA)
EFA	: Exploratory factor analysis (EFA)
r	: Correlation analysis (r)
ICC	: Intraclass Correlation Coefficient (ICC)
ARV	: Initiating antiretroviral (ARV)
HIV	: Human immunodeficiency viruses (HIV)
BF	: Breastfeeding (BF)
HC	: Head circumference (HC)

FDA : Food and Drug Administration

KR : Kuder and Richardson

USA : United States of America (USA)

ABSTRACT

Sonita, A. (2023). Knowledge, attitude, and practice of community pharmacists in maternal and child health services. Yeditepe University Institute of Health Sciences, Department of Clinical Pharmacy, MSc Thesis, Istanbul.

Objective: Maternal and child health is in disputable public health matter potentially affecting the quality of life of both current and future generations as mothers and their children account for more than two-thirds of the world's population. The aim of this study was to evaluate the knowledge, attitude, and practice of community pharmacist in relation to maternal and child health services, since appropriate use and management of medications in pregnancy is an essential component of parental care and pregnant women health.

Materials and Methods: A cross-sectional research conducted within the community pharmacies of Istanbul. The target population for this study consisted of all licensed pharmacists. A minimum sample size of 385 participants were required during their shift either written or using online. A questionnaire was validated consisting of 41 items. Main outcome measure involved pharmacist's knowledge, attitude, and practice in maternal and child health services. A written consent form was acquired, and study design received approved by an ethical committee. Statistical analysis was carried using SPSS.

Results: Among the 750 community pharmacy professionals who were approached randomly, a total of 430 individuals expressed their willingness to participate in the study by completing the questionnaire. Ultimately, 408 of these participants successfully fulfilled the entire questionnaire. Among the participants, 343 individuals (84.1%) identified as female, whereas 65 individuals (15.9%) were identified as male. About 80.5% of the respondents had good knowledge regarding contraceptive method. The majority of the respondents had a positive attitude (n = 241; 59.16%) and good practice (n = 197; 48.32%). The Psychometric properties of the developed tool show good reliability, Cronbach's alpha values were 0.871 for attitude and 0.823 for practice. KD test ranged 0.41 for contraceptive and sexual health, 0.48 for maternal and antenatal, 0.38 for neonatal and child care and 0.45 for infant growth assessment. The intraclass correlation coefficients were ranged from 0.833/ 0.801 for both Attitude and practice scales at baseline and after 8 days.

Conclusion: The findings of the study indicate that community pharmacists exhibited favorable attitudes and practices. However, it was observed that their level of knowledge pertaining to maternal and child health was inadequate. This underscores the persistent

need to enhance the knowledge, attitudes, and practices of community with regards to maternal and child health.
Keywords: Maternal health, Child health, Pharmacist, Competency, Practice, Türkiye.

ABSTRACT (Türkish)

Sonita, A. (2023). Anne ve çocuk sağlığı hizmetlerinde topluluk eczacılarının bilgi, tutumu ve uygulaması. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü, Klinik Eczacılık Bölümü, MSC Tezi, İstanbul.

Amaç: Toplumda, anne ve çocuk sağlığı, anne ve çocukları dünya nüfusunun üçte ikisinden fazlasını oluşturdukları için hem mevcut hem de gelecek nesillerin yaşam kalitesini etkileyen tartışmalı halk sağlığı konularında. Hamilelik sırasında uyuşturucu kullanımı söz konusu olduğunda, bir topluluk eczacı tipik olarak insanların yardım için yönlendirdiği ilk kişidir. Bu çalışmanın amacı, İstanbul, Türkiye'deki anne ve çocuk sağlığı hizmetleri ile ilgili olarak toplum eczacının bilgisini, tutumunu ve uygulamasını değerlendirmektir, çünkü gebelikte ilaçların uygun kullanımı ve yönetimi ebeveyn bakımının ve hamile kadın sağlığının önemli bir bileşenidir.

Bulgular: Yaklaşan 750 topluluk eczane profesyonelinden, toplam 430 kişi anketi doldurarak çalışmaya katılma isteklerini ifade etti. Sonuçta bu katılımcılardan 408'i anketin tamamını başarıyla doldurdu. Katılımcıların 343'ü (%84,1) kadın, 65 kişi (%15,9) ise erkek olarak tanımlandı. Ankete katılanların yaklaşık %80,5'i doğum kontrol yöntemi konusunda iyi bilgiye sahipti. Ankete katılanların çoğunluğu olumlu tutuma (n = 241; %59,16) ve iyi uygulamaya (n = 197; %48,32) sahipti. Geliştirilen aracın Psikometri özellikleri iyi bir güvenilirlik göstermektedir; Cronbach alfa değerleri tutum için 0,871 ve uygulama için 0,823'tür. KD testi doğum kontrolü ve cinsel sağlık için 0,41, anne ve doğum öncesi için 0,48, yeni doğan ve çocuk bakımı için 0,38 ve bebek büyüme değerlendirmesi için 0,45 arasında değişiyordu. Sınıf içi korelasyon katsayıları hem Tutum hem de uygulama ölçekleri için başlangıçta ve 8 gün sonra 0,833/ 0,801 arasında değişiyordu.

Sonuç: Çalışmanın bulguları, topluluk eczacılarının olumlu tutum ve uygulamalar sergilediğini göstermektedir. Bununla birlikte, anne ve çocuk sağlığı ile ilgili bilgi düzeylerinin yetersiz olduğu gözlenmiştir. Bu, anne ve çocuk sağlığı açısından toplumun bilgisini, tutumlarını ve uygulamalarını geliştirmek için kalıcı ihtiyacın altını çizmektedir.

Anahtar Kelimeler: Anne sağlığı, Çocuk Sağlığı, Eczacı, Yetkinlik, Uygulama, Türkiye.

1. INTRODUCTION

In society, maternal and child health is indisputable public health matter potentially affecting the quality of life of both current and future generations as mothers and their children account for more than two-thirds of the world's population[1].

Maternal and child health care could form a continuum of an integrated care that spans from adolescence or pre-pregnancy to delivery and childhood. Maternal and child health care became a worldwide concern with the high incidence of maternal and child mortality observed within the past three decades [2].

Complications during pregnancy and childbirth are the leading cause behind death. Globally, annual unintended pregnancies contribute to maternal and child mortality through 25 million unsafe abortions, 47,000 maternal deaths, 2.7 million neonatal deaths and a couple of 6 million stillbirths [2].

In 2018, an estimated 5.3 million children die of preventable illnesses, and more than half of those deaths occurred in sub- Saharan Africa. In 2017, over 295, 000 women died from preventable pregnancy and delivery complications, with over 94 percent of those deaths occurring in low-resource nations. By 2030, the United Nations (UN) has set a target of a three-quarters decrease in maternal fatalities and a one-third reduction in premature child deaths. Access to health care must be enhanced globally to meet the UN's Sustainable Development Goal (SDG) of reducing maternal and child mortality [3].

When it comes to drug use during pregnancy, a community pharmacist is typically the first-person people turn to for assistance. Due to the fact that 50% of pregnancies are unplanned, a woman may learn she is pregnant while taking medicine and seek medical advice from a nearby drug store to see if she has harmed her baby [4].

Pharmacists must exercise caution when distributing drugs to this patient group because of the medication's potential negative effects on the mother and growing fetus. Changes in pharmacokinetics/pharmacodynamics parameters during pregnancy, as well as embryonic/fetal age, drug dose, duration of use, risk-benefit profile, and changes in pharmacokinetics/pharmacodynamics parameters, must all be carefully examined. Although most drugs are non-teratogenic and can be used safely during pregnancy, consumers are often concerned about the unborn child's safety. These fears are sometimes exaggerated by media

stories in the aftermath of the thalidomide crisis. Consumers' over estimation of teratogenic hazards could lead to non-adherence to needed therapy and sub-optimal control of maternal diseases, putting both mother and fetus' health and safety at risk [5].

The aim of this study is to evaluate the knowledge, attitude, and practice of community pharmacist in relation to maternal and child health services in Istanbul, Türkiye since appropriate use and management of medications in pregnancy is an essential component of parental care and pregnant women health.

2. LITERATURE REVIEW

2.1 Maternal health:

The term "maternal" is frequently employed to refer to aspects or attributes that relate to or are associated with a mother. As per the definition provided by the Merriam-Webster dictionary, the term "maternal" pertains to or is associated with a mother, exhibiting qualities or characteristics typically attributed to a motherly figure [8].

Maternal health refers to the health of women during pregnancy, childbirth, and the postpartum period (the first weeks after giving birth) [9,10]. It includes the physical, mental, and social well-being of women during this critical time, as well as the outcomes of pregnancy and childbirth. Maternal health is crucial component of public health and is a key indicator of the health of a population [10].

According to the World Health Organization (WHO), maternal health encompasses “the health of women during pregnancy, childbirth, and the postpartum period, and the health and survival of their newborns.” The WHO defines maternal health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.”[11].
Maternal well-being is influenced by a multitude of factors, encompassing access to healthcare services, nutritional intake, socioeconomic standing, and environmental conditions. Insufficient provision of maternal healthcare services can give rise to complications during the course of pregnancy and childbirth, thereby contributing to increased rates of maternal and infant mortality and morbidity [11,12] .

2.2 Child health:

Child health encompasses various dimensions of well-being, including physical, mental, intellectual, social, and emotional aspects, rather than solely focusing on the absence of disease or infirmity. Healthy children thrive in biological, environmental, and community environments that provide them the chance to achieve their utmost developmental capacity [13,14]. Child health refers to the well-being and physical condition of individuals in the pediatric age group, encompassing the period from birth to adolescence. This field of study primarily emphasizes the health status of children below the age of five. Newborn health refers to the overall well-being and medical condition of infants during the initial 28 days following their birth [15].

Safeguarding and enhancing the well-being of children is a fundamental importance. In recent decades, significant advancements have been made in enhancing the well-being and reducing the fatality rate of infants and young children [16].

2.3 Maternal and child health (MCH) services:

Maternal and Child Health (MCH) care refers to healthcare services that have been designed to address the unique needs of women during their childbearing years and their offspring. The main focus of MCH care centers around women within the reproductive age range, particularly those aged 15 to 49 years. Additionally, attention is given to children, adolescents, and individuals within the school-age demographic [1].

The primary objective of offering maternal and child health care services is to enhance the overall well-being of both the mother and her child, while also optimizing the potential outcomes of any subsequent pregnancies they may decide to pursue [17], Since mothers and children collectively constitute more than two-thirds of the total population. The demographic composition of individuals within the reproductive age group (15-49 years) is comprised of women, accounting for 21% of the population. Pregnant women make up 4.5% of this group. Additionally, children under the age of 15 constitute 47% of the population, with children under 5 representing 18%, children under 3 accounting for 12%, and infants comprising 4% of the total population [1,18].

The field of MCH includes a wide array of healthcare services that are specifically designed to address the diverse needs of pregnant women, infants, and young children. The primary objective of these services is to facilitate the enhancement of overall well-being, reduce the occurrence of illnesses deliver medical attention and intervention for pre-existing health conditions, and facilitate the recovery and restoration of patients. The program specifically focuses on pregnant women during the prenatal, antenatal, and postnatal stages, as well as children aged from birth to five years. MCH strives to secure the health of both mothers and children through the provision of comprehensive care [19].

These services have been specifically developed to enhance the overall health and well-being of both the mothers and their children.

Prenatal care is the identification of pregnant women who are at risk of delivering a preterm or growth-restricted infant is a widely acknowledged approach. This approach encompasses the implementation of various medical, nutritional, and educational interventions aimed at reducing the prevalence of low birth weight and other unfavorable conditions and outcomes during pregnancy. The principal objective of prenatal care is to safeguard the health and welfare

of both the mother and the child by identifying and managing potential risks and implementing timely interventions. By granting pregnant women with the opportunity to receive comprehensive prenatal care, healthcare providers are able to identify and address any potential health concerns at an early stage, thereby resulting in improved outcomes for both the mother and the child [20].

The delivery of labor and delivery care encompasses the provision of a childbirth experience that is satisfactory or exceeds a woman's personal and sociocultural beliefs and expectations. This encompasses the provision of optimal care for the delivery of a healthy infant within a secure clinical and psychological environment, accompanied by continuous practical and emotional assistance from a birth companion(s) and compassionate, skilled clinical staff [21].

Effective postpartum care must address the unique requirements of both the mother and the infant in this critical period. This involves taking preemptive measures to identify and treat any potential complications or illnesses, as well as offering guidance and support regarding breastfeeding, birth spacing, immunization, and maternal nutrition. By providing comprehensive care that is tailored to the specific needs of each patient, healthcare providers can help ensure the optimal health and wellbeing of both the mother and her child [22].

The delivery of well-child care (WCC) during the period of infancy and early childhood offers an essential opportunity to address notable social, behavioral, developmental, and health-related challenges that impact children. The primary objective of the WCC program is to provide parents with the necessary knowledge and confidence to ensure that their children reach their full developmental potential and achieve optimal health outcomes. [23].

Immunization is a medical intervention that imparts immunity or resistance to infectious diseases in both the maternal and fetal populations. The achievement of this objective is commonly realized by means of the administration of a vaccine. The implementation of this preventative measure has demonstrated a high level of efficacy in decreasing the occurrence of diseases, disabilities, and fatalities that result from vaccine-preventable diseases (VPDs) [24].

The practice of family planning offers numerous health and social advantages to women. By preventing unintended, unwanted, and unplanned pregnancies, it effectively reduces the incidence of unsafe and illegal abortions. Additionally, family planning significantly decreases the likelihood of maternal mortality resulting from pregnancy and childbirth-related causes. Overall, family planning serves as a critical tool in improving women's health and well-being [25].

The implementation of effective nutrition education programs has the potential to significantly minimize the occurrence of unfavorable health consequences for both mothers and children by enhancing maternal nutrition [26].

2.4 Epidemiology of maternal and child health:

The epidemiology of maternal and child health focuses on understanding the distribution, determinants, and outcomes of health-related events in these populations.

Maternal mortality:

Maternal mortality refers to the demise of a woman during pregnancy or within 42 days after the termination of pregnancy, regardless of the location and duration of the pregnancy. This outcome is attributed to factors directly associated with or exacerbated by the pregnancy or its medical care, excluding accidental or incidental causes [1,27]. Numerous countries have documented incidents of maternal mortality, whereas in developed nations, the rates of maternal mortality typically range from 5 to 10 per 100,000 live births. Conversely, in the least developed nations, the ratios exhibit a magnitude that is 100 times greater [28].

Maternal morbidity:

Maternal morbidity refers to the occurrence of health conditions during pregnancy and childbirth that can adversely affect the overall well-being and functional abilities of women [29].

According to a recent study conducted in Belgium utilizing health insurance data, it was found that a significant proportion, specifically 80%, of pregnant women who underwent childbirth between the years 2014 and 2016 were prescribed and subsequently received at least one reimbursed medication during the course of their pregnancy. Furthermore, it is worth noting that approximately 7% of women within this cohort were prescribed a medication that may possess potential risks when administered during pregnancy [30].

Reducing maternal and perinatal mortality rates is a matter of utmost importance on a global scale. This objective can be effectively accomplished through the provision of high-quality antenatal care visits, ensuring safe delivery by skilled healthcare professionals, establishing accessible urgent obstetrical and neonatal care services, and implementing regular health monitoring for both the mother and newborn. Specifically, monitoring should occur within the initial 24 hours following birth and subsequently once or twice during the first week [31].

Globally, there was a significant decline of 45% in the overall maternal mortality rate, with the number of deaths decreasing from 523,000 in 1990 to 289,000 in 2013. In a similar vein, the global maternal mortality ratio (MMR) experienced a decrease of 45% over the course of two decades, dropping from 380 maternal deaths per 100,000 live births in 1990 to 210 in 2013. This decline reflects an average annual reduction of 2.6%. The global MMR experienced an annual decline of 3.3% between the years 2005 and 2013, which is a faster rate compared to the average annual decline of 2.2% observed between 1990 and 2005 [27].

The available evidence indicates that the developing world bears the predominant burden of maternal mortality. In 2005, approximately 500,000 women died to pregnancy-related complications. Of this total, 50% of the fatalities occurred in Africa, while an additional one-third took place in South East Asia [32].

According to a study conducted in 2014, the global population of pregnant women in 2012 exceeded 200 million [31]. In the last three decades, there has been a twofold increase in the proportion of women who utilize medications while pregnant. Presently, it is approximated that 90% of pregnant women are involved in the consumption of at least one medication during the period of gestation [32]. This phenomenon can be attributed to either pre-existing (chronic) conditions or conditions that have emerged as a consequence of the pregnancy [5].

According to the World Health Organization, there were an estimated 303,000 maternal deaths worldwide in the year 2015. This resulted in a MMR of 216 maternal deaths per 100,000 live births across 183 countries and territories. In the year 2015, there was an estimated risk of maternal mortality of approximately 1 in 180 throughout a woman's lifetime. In poor regions, the MMR exhibits a value of 239, which is approximately 20 times higher than the corresponding figure observed in developed regions, where it stands at a mere 12. Approximately 99% (302,000) of the estimated global maternal deaths in 2015 took place in developing regions. Among these, sub-Saharan Africa accounted for approximately 66% (201,000) of the total, followed by Southern Asia with 66,000 deaths [33].

In addition, Based on data from the WHO, approximately 287,000 women experienced mortality during and in following pregnancy and childbirth in the year 2020. In the meantime, a significant majority of maternal deaths, approximately 95%, happened within low and lower middle-income nations. Moreover, it is important that a considerable proportion of these fatalities could have been avoided through appropriate preventive measures [34].

A report from a recent study conducted in 2023, the United States currently exhibits a maternal mortality rate of 16.9 deaths per 100,000 live births. The mortality rate for black women stands at 42.4 deaths per 100,000 live births, while American Indian and Alaskan women experience

a rate of 30.4 deaths per 100,000 live births. The mortality rate for women aged 40 and above during childbirth is 16 times higher compared to younger women [35].

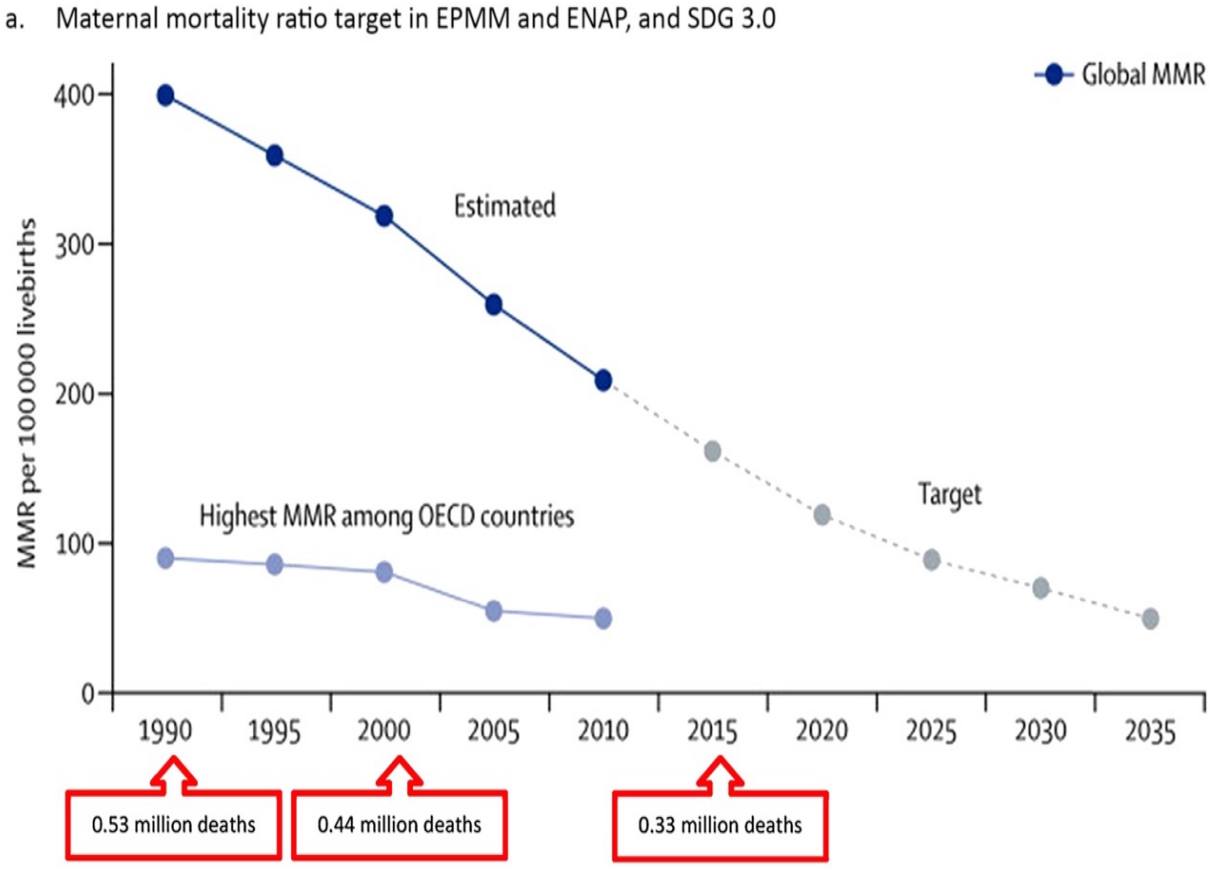
Furthermore, it is important to note that despite notable progress in reducing global under-five mortality rates, this issue remains a significant public health concern in developing nations, particularly in Sub-Saharan Africa. Throughout the period from 1990 to 2016, this region consistently exhibited higher rates of under-five mortality compared to other geographical areas. In 2016, the global under-five mortality rate was recorded at 41 deaths per 1000 live births, indicating a decrease from the previous rate of 93 deaths per 1000 live births in 1990. According to a publication in BMC Public Health, there has been a 56% decrease in global under-five mortality rates [36].

Based on reports from United Nations International Children's Emergency Fund (UNICEF), it has been observed that the under-five mortality rate has experienced a significant decline of almost 50% since 1990, with the number of deaths per 1,000 live births decreasing from 90 to 46 in the year 2013. At present, the rate of mortality among children under the age of five on a global scale is experiencing a more rapid decline than any other period within the last twenty years. However, the current level of progress is inadequate in achieving the Millennium Development Goal 4 (MDG 4), which aims to decrease the under-five mortality rate by two-thirds between 1990 and 2015 [37].

In the year 2020, a total of 5.0 million deaths were recorded among children below the age of five. This figure signifies a daily average of 13,800 premature deaths of children in the specified age range throughout the year. There exists an unacceptably high incidence of child mortality, which is predominantly attributable to preventable causes. Despite the fact that there has been a reduction of over 50% in global under-five mortality rates when compared to 1990. Despite this notable advancement, there remains a pressing imperative to enhance child survival [38].

The targets for achieving the cessation of preventable maternal, newborn, and child deaths and stillbirths by the year 2030 are shown in Figure 1. This visual representation highlights the alignment of these targets with the SDGs, Every Newborn Action Plan (ENAP), and the Ending Preventable Maternal Mortality (EPMM) [39].

Fig. 1/a. Targets in SDGs, EPMM and ENAP by 2030 for ending preventable maternal, newborn and child deaths and stillbirths [37].



F1.a shows Maternal Mortality: The global target is to achieve a MMR of less than 70 deaths per 100,000 live births by 2030. Specific sub-targets are established based on the country's baseline level in 2015. Countries should either reduce their MMR by at least two-thirds of their baseline, ensure their MMR is not greater than 140 deaths per 100,000 live births by 2030, or address inequalities in MMR at a subnational level. Countries with the highest MMRs (MMR >420) will need to achieve an Annual Rate of Reduction (ARR) greater than 5.5% [39] .

b. Neonatal mortality rate target in Every Newborn and SDG 3

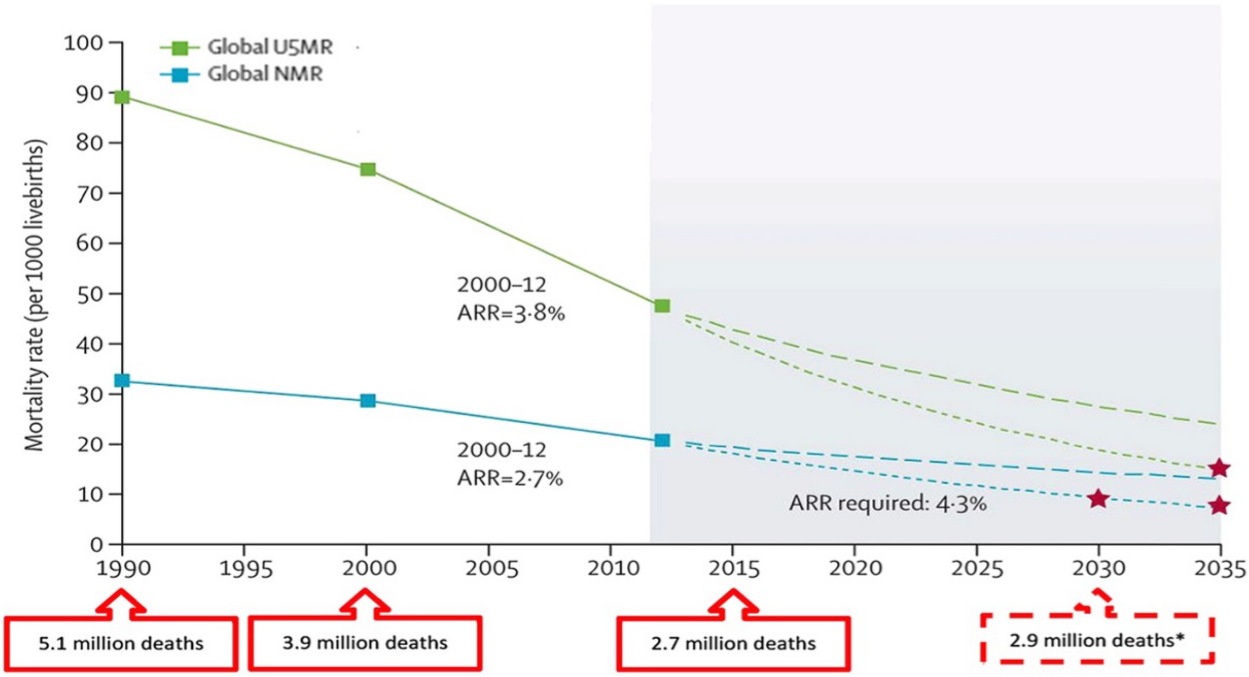


Fig. 1/b. Targets in SDGs, EPMM and ENAP by 2030 for ending preventable maternal, newborn and child deaths and stillbirths [37].

F1.b shows Newborn Deaths: The ENAP has set a target of 12 or fewer neonatal deaths per 1,000 live births in every country by 2030. To achieve this, an Average ARR) of 4.3% is required globally. However, the required ARR may vary significantly between countries. Approximately 29 countries will need to double their ARR to reach the target [39].

c. Stillbirth rate target in Every Newborn but not included in SDGs

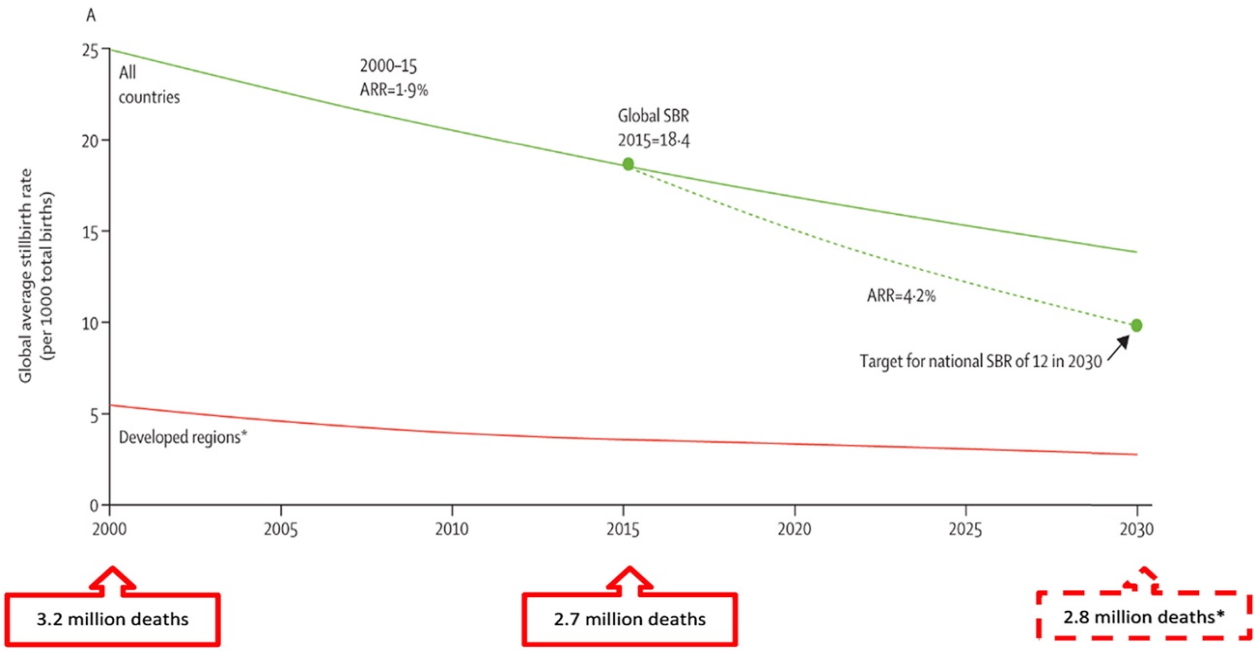


Fig. 1/c. Targets in SDGs, EPMM and ENAP by 2030 for ending preventable maternal, newborn and child deaths and stillbirth [37].

F1.c shows Stillbirths: The ENAP has set a target of 12 or fewer stillbirths per 1,000 total births in all countries by 2030. To achieve this, a global ARR of 4.2% is necessary. Approximately 56 countries will need to double their ARR to meet the target [39].

These targets highlight the collective efforts needed to reduce maternal, newborn, and child mortality and improve overall health outcomes for mothers and children around the world [39].

2.5 Factor associated with maternal mortality:

The term "adverse pregnancy outcome" encompasses a wide range of health issues that can arise for the mother, newborn, or both throughout the various stages of pregnancy, labor and delivery, and the postpartum period [40].

A study conducted in the United States revealed that women living in the US exhibit a higher likelihood of mortality resulting from childbirth or pregnancy-related causes compared to women in other high-income nations. Furthermore, it was observed that black women experience mortality rates that are three to four times higher than those of white women. The three most prevalent preventable causes of pregnancy-related mortality, as identified by the Centers for Disease Control and Prevention, are postpartum hemorrhage, severe hypertension, and venous thromboembolism [41].

The following are the main factors that contribute to maternal mortality, according to a global WHO analysis:

- Hemorrhage, 27.1 percent. More than 72.6 percent of deaths from hemorrhage were classified as postpartum hemorrhage.
- Hypertension, 14.0 percent.
- Sepsis, 10.7 percent.
- Abortive outcomes, 7.9 percent
- Embolism and other direct causes, 12.8 percent [42].

2.6 Millennium Development Goals (MDGs), Sustainable Development Goals (SDMs) and International Pharmaceutical Federation (FIP):

In the year 2000, a declaration on eight Millennium Development Goals (MDGs) was signed by 189 world leaders. These goals aimed to address issues such as hunger, poverty, illiteracy, disease, discrimination against women, and environmental degradation, with the objective of achieving significant improvements by the year 2015 [43]. The study published on February

13, 2014, indicates that the MDGs have garnered extensive support and are regarded as the most comprehensive development goals ever established on a global scale [44]. Among the eight MDGs, Goal 4 is specifically aimed at reducing child mortality, while Goal 5 focuses on improving maternal health [45].

The adoption of the new development agenda titled "Transforming our world: the 2030 agenda for sustainable development" took place on September 25, 2015, during the session of the UN General Assembly [46], The SDGs exhibit notable distinctions from the MDGs, extending beyond merely differences in the quantity of objectives and targets. These differences encompass their fundamental objectives, conceptualization, and the political mechanisms that facilitated their development [47].

Nevertheless, there has been a lack of consistent advancement, particularly in the African continent, the least developed nations, landlocked developing countries, and small island developing States. Several MDGs pertaining to the health of mothers, newborns, and children, as well as reproductive health, have not been achieved. The SDGs have been formulated with the aim of fulfilling all MDGs, including those that are still pending. This is achieved through a targeted approach that prioritizes and enhances support to least developed countries and other nations that encounter significant challenges. These efforts align with relevant assistance programs that are in place. The newly proposed Agenda builds upon the accomplishments of the MDGs and seeks to effectively tackle the persisting differences in global development [46].

The FIP Development Goals, which were introduced by the International Pharmaceutical Federation (FIP) in September 2020, serve as a significant tool for the comprehensive advancement of the pharmacy profession on a global, regional, and national scale in the upcoming decade. These initiatives are in accordance with the mission of the FIP, which aims to promote global health by facilitating the progress of pharmaceutical practice, sciences, and education. Furthermore, they are poised to revolutionize the field of pharmacy in accordance with the broader global objectives that underpin the United Nations' SDGs [48].

2.7 Impact of maternal and child health in Türkiye:

The current population of Türkiye stands at 85.7 million individuals, with projections indicating a peak of 97.96 million by the year 2059. The fertility rate in Türkiye stands at 1.99 births per woman, which falls below the population replacement threshold of 2.1 births per

woman. The birth rate is recorded at a rate of 15.3 births per 1,000 individuals. On a daily basis, there is an estimated range of 3,324 to 4,173 live births [49,50].

Research indicates that early marriages are associated with adverse outcomes in terms of pregnancy, childbirth, and the postpartum period among young women. The lack of regular reproductive healthcare during the reproductive period hinders the effectiveness of preventive measures against commonly observed diseases in women [51].

Türkiye exhibits elevated rates of infant mortality. In recent decades, despite adult mortality rates in this country being comparable to those of other nations with similar socioeconomic characteristics, its life expectancy at birth has persisted at a relatively low level primarily due to a significant infant mortality rate [52].

In 1993, the annual infant mortality rate stood at approximately 52.6 deaths per 1,000 live births, whereas by 2008, this figure had decreased to 17 deaths per 1,000 live births. In 1998, the maternal mortality rate stood at approximately 70 deaths per annually per 10,000 live births. By 2008, this rate had decreased by a factor of four, resulting in a figure of approximately 19 deaths per annum per 10,000 live births. The reduction in maternal mortality can be attributed to advancements in prenatal care and meticulous monitoring of pregnancies [53].

Another study's result showed the estimated burden of premature mortality in Türkiye based on Standard Expected Years of Life Lost (SEYLL) for the years 2001 and 2008. The total SEYLL in 2001 was approximately 4,104,253, and it increased to about 4,472,443 in 2008 [54].

Based on a study published in the Middle East Journal of Family Medicine, the maternal mortality rate was approximately 100 per 100,000 live births in the year 2004 [51].

Türkiye has successfully experienced a significant reduction of 77.4% in the under-5 mortality rate, decreasing from 72 deaths per 1,000 live births in 1990 to 16 deaths per 1,000 live births in 2010. Similarly, there was a significant decline in the infant mortality rate, which decreased by 79.1% from 60 deaths per 1,000 live births to 13 deaths per 1,000 live births during the time frame. Additionally, there has been a comparable decrease in the maternal mortality ratio, with a decline from 40 per 100,000 live births in 1990 to 20 per 100,000 live births in 2013 [55].

During the period spanning from 2012 to 2015, a total of 812 maternal deaths were recorded. In 2012, the maternal mortality ratio stood at 15.4 deaths per 100,000 live births, while in 2015,

it decreased slightly to 13.7 deaths per 100,000 live births. In 2012, the median age of women was reported as 32 years, with a range of 18 to 49 years. This figure can be compared to the median age of women in 2015, which was also 32 years, with a range of 16 to 44 years. The majority of maternal deaths occurred in women below 35 years of age in all years. However, statistical significance was not observed in the distribution of maternal deaths between the two age groups in 2012 (56). Also, according to their data, women below 35 years consistently experienced higher maternal mortality rates compared to those aged 35 or above ($p < 0.001$). The odds ratios (OR) with 95% confidence intervals (CI) further support this, indicating a higher risk of maternal death (OR range: 2.97 to 3.97) for women below 35 years throughout the study period [56].

2.8 The role of community pharmacist in MCH:

Community pharmacists, along with other healthcare providers, play a significant role in the delivery of health services due to their knowledge and accessibility to patients. As a result, they often serve as the initial point of contact for addressing healthcare needs [57]. The term of "community-based pharmacist practitioner" emphasizes the distinct set of abilities that pharmacists employ in the delivery of patient care services, thereby acknowledging the significant contributions that community pharmacists make to patients, communities, and the healthcare system [58].

The role of the community pharmacist has undergone significant transformation since the inception of pharmaceutical care nearly three decades ago. As per the latest definition provided by the Pharmaceutical Care Network Europe, pharmaceutical care is characterized as the pharmacist's active involvement in the provision of care to individuals, with the aim of enhancing the utilization of medications and enhancing health outcomes [59].

Community pharmacies provide the general public with convenient access to medications, as well as the opportunity to seek guidance on health-related matters and address minor ailments through the utilization of over-the-counter products. Research has demonstrated that the incorporation of pharmacists into community health systems yields enhancements in medication therapy, disease prevention, and the advancement of overall well-being [60].

Pharmacists play a vital role in the management of medication usage during pregnancy, as they often serve as the initial point of contact and the ultimate healthcare provider that patients interact with following the receipt of a prescription. Pharmacists possess the potential to contribute to the prevention of drug-related complications through the evaluation of the probability of fetal exposure, as well as the examination of prescriptions to identify instances of dosage inaccuracies and potential drug interactions [5]. They play a significant role in multiple aspects of maternal and child health within the primary health care framework, which strives to achieve equal medical results and enhance accessibility to services. These contributions encompass diverse areas including immunization, nutrition, and disease control [61].

Community pharmacists possess the necessary expertise and capabilities to effectively address the health-seeking tendencies of the population they serve, particularly with regard to the early detection and prevention of diseases, as well as the promotion and enhancement of overall health [62].

In the United Kingdom, community pharmacies exhibit greater accessibility to the general population in comparison to general practices. Hence, there has been a call for the expansion of the responsibilities of community pharmacists, as highlighted in government white papers and briefing documents, as well as recommendations put forth by pharmacy professional bodies. This expansion primarily pertains to the provision of services aimed at disease prevention and the enhancement of overall health. The global existence of evidence supporting the expansion of these roles remains uncertain [62].

Pharmacists play a crucial role in delivering high-quality pharmaceutical care to mothers and children throughout the whole spectrum of maternal and child health services, spanning from pregnancy to early childhood. They play an important part in immunization programs through the acquisition and administration of vaccines. Pharmacists serve a significant role in enhancing the efficacy of the healthcare system through their involvement in identifying patients in need of vaccinations and delivering counseling and education to promote appropriate medication utilization [61].

The FIP council has endorsed a policy statement affirming the expanded responsibilities of pharmacists in enhancing maternal, newborn, and MCH services [63]. The policy statement is grounded in the professional responsibilities of pharmacists and centers on their contribution

to the United Nations' SDG of decreasing maternal and child mortality rates. The primary objective is to reduce mortality among these vulnerable populations by enhancing their access to Primary Health Care (PHC) services [64]. According to the recommendations put forth by the FIP (International Pharmaceutical Federation), there is evidence to suggest that pharmacist-based services can effectively contribute to the promotion of positive maternal and MCH outcomes. It is important to note that there may be variations in the extent of involvement and practice among pharmacists in this regard [65–68].

Community pharmacists in France hold an essential role in assessing medications. Furthermore, they offer guidance even in situations where medication is not being prescribed. In the domain of pregnancy, pharmacists play a pivotal role in aiding women by providing the identification of symptoms necessitating medical intervention, providing suitable recommendations for over-the-counter (OTC) medications to address minor illnesses, and offering guidance against the utilization of drugs that may pose risks to the developing fetus. In addition, they actively advocate for the utilization of periconceptional folic acid and provide recommendations regarding dietary and hygiene practices [68].

Community pharmacies provide the general public with convenient access to medications, as well as the opportunity to seek guidance on health-related matters and address minor ailments through the utilization of over-the-counter products. Research has demonstrated that the incorporation of pharmacists into community health systems yields enhancements in medication therapy, disease prevention, and the advancement of overall well-being [69].

2.8.1 Impact of pharmaceutical services on MCH:

Community pharmacists have a substantial impact on maternal and child health services by providing essential care, immunizations, counseling, and support to pregnant women, mothers, and children. They play a crucial role in improving access to healthcare services, increasing vaccination coverage, ensuring safe medication use during pregnancy and lactation, and managing minor symptoms. Despite facing some barriers, their expanding role in MCH services contributes to better health outcomes for mothers and children, making them valuable contributors to overall public health [3].

According to a study Eastern Mediterranean Region (EMR), pharmacists have a significant impact in increasing access to Sexual and Reproductive Health (SRH) self-care interventions in the EMR. Their accessibility, expertise, and patient education empower individuals in their health care decisions. Addressing challenges and gaining greater recognition and support from governments and health authorities will further enhance their role in promoting SRH self-care interventions [70].

The impact of pharmacists is significant in improving maternal and child health. Community-based pharmacists play a crucial role in providing interventions and support to pregnant women and women planning pregnancy. The pharmacist-led interventions showed positive outcomes, such as improved adherence to iron supplements, increased knowledge and use of folic acid supplements, and higher smoking cessation rates in pregnant women. These interventions were effective and feasible, delivered in a single interaction with pharmacists [71].

2.8.2 Pharmacist preparedness and competency development in MCH services:

A combination of comprehensive therapeutic knowledge, experience, problem-solving skills, and judgment is necessary in order to be a competent community pharmacist. Clinical problem solving and decision making are the processes by which patient-specific data are collected, interpreted, and analyzed; medical problems are assessed; current drug therapy is evaluated; and therapeutic plans are developed. These processes are critical to optimizing medication therapy [72].

Physiologic changes occur during pregnancy that can alter the effective dose of medications a woman is taking. Some changes occur abruptly, while others evolve slowly. Most begin during the first trimester and peak during the second trimester of pregnancy [73]. It may be necessary to adjust the dose and/or frequency of medication use repeatedly during pregnancy. Physiologic changes that can affect the pharmacokinetics and/or pharmacodynamics of medications during pregnancy include changes in total body weight and body fat composition. Delayed gastric emptying, prolonged gastrointestinal transit time, and decreased gastric acid secretion, all of which can affect the bioavailability of drugs [74–76]. Expanded plasma volume and significantly increased extracellular fluid space and total body water content. These vary with the patient's weight and can affect the volume of distribution of drugs [77]. Increased cardiac output, stroke volume, heart rate, and blood flow to the uterus, kidneys, skin, and mammary glands. The percentage of cardiac output attributed to hepatic blood flow is lower during pregnancy [78]. Decreased concentration of plasma albumin, which can reduce the protein

binding of some drugs [79]. Increased glomerular filtration rate early in pregnancy, with a continued rise throughout pregnancy [80]. Changes in the activity of hepatic enzymes, including the cytochrome P450 enzymes, xanthine oxidase, and N-acetyltransferase [81,82].

Pharmacists are required to possess the ability to recognize patient issues, execute and oversee patient pharmacotherapy, distribute, and administer medications as necessary, provide patient education, monitor drug therapy, and collaborate with other healthcare professionals to enhance patient outcomes [72]. The primary healthcare approach employed by pharmacists encompasses various key elements, such as appropriateness, availability, adequacy, accessibility, acceptability, affordability, accountability, comprehensiveness, and continuity [83].

Pharmacist Competency in Primary Healthcare for Mother and Child Health:

Providing comprehensive pharmaceutical care from antenatal to childhood for both mothers and children is a key competency of pharmacists in primary healthcare. Pharmacists play a crucial role in immunization, which involves administering vaccines to make individuals immune or resistant to infectious diseases. Vaccines are safe, cost-effective, and efficient in preventing certain preventable infectious diseases, improving overall health globally [84]. The WHO works towards eradicating major infectious diseases through global immunization efforts, and vaccines contribute to minimizing the financial burden on families, increasing community awareness, and improving the quality of life [85]. Cold chain management is essential in the procurement and storage of vaccines, ensuring they are maintained at the required temperature [84]. In the area of nutrition, pharmacists advise mothers on the use of formulas containing probiotics, particularly for those who choose not to exclusively breastfeed. Probiotics are attenuated microorganisms that enhance the host's immunity when administered in adequate amounts [61].

3. MATERIALS AND METHODS

3.1. Study Design and Population

This is a cross-sectional study conducted within the community pharmacies in Istanbul, Türkiye between 2021 and 2023. All the licensed pharmacists are the target population for this study. A minimum sample size of 385 participants were required.

The minimum sample size (n=385) for this observational study was calculated by using the following equation:

S = Z2 x p × (1 - p)/c2, where Z represents the confidence level (for example, 1.96 confidence level for 95%), p is the choice of estimated percentage (assigned 50%) and c is the desired level of precision, i.e., 0.05 [7].

3.1.1. Inclusion Criteria

- Community pharmacists with 1 year or more experience and accept to sign or fill consent form.

3.1.2. Exclusion Criteria

- Participants who did not fill all the questions completely.

3.2. Data collection

The questionnaire was uploaded and distributed online containing a link and information regarding the present study. Community pharmacists' consent was obtained electronically. Participants were then led to the survey after giving their consent.

3.3. Study tool

The questionnaire is designed to test community pharmacist's knowledge, attitude, and practice (KAP) regarding maternal and child health services.

The questionnaire is divided into two sections. In first section (age, gender, nationality, qualification, experience, and average number of prescriptions dispensed per day) are among the socio- demographic factors mentioned.

The second section is subdivided into three components, namely Knowledge, Attitude, and Practice.

For knowledge assessment, a 10-point scale is employed to assess the level of knowledge possessed by community pharmacists in relation to maternal and child health. The score range from zero to a maximum of ten points. Points are allocated for providing responses to each individual question contained within the questionnaire. In the section pertaining to knowledge,

four distinct aspects have been addressed, that is Contraception and Sexual Health, Maternal and Antenatal Care, Neonatal and Childcare, and Infant Growth Assessment.

The assessment consists of 12 questions, each worth 1 point. The total score is rounded up to 10 points. Participants who achieved a score of 6 or higher are classified as possessing sufficient knowledge regarding maternal and child health, while those who score below 6 are categorized as having inadequate knowledge.

In the second part, a Likert scale is employed to assess the participants' attitude towards maternal and child health services, utilizing a set of 15 statements. The Likert scale encompasses a range of responses for each statement, including both positive and negative options. These options are represented by numerical values, with "strongly agree" assigned a value of 5, "agree" assigned a value of 4, "uncertain" assigned a value of 3, "disagree" assigned a value of 2, and "strongly disagree" assigned a value of 1. All assertions are anticipated to receive a maximum score of 75 and a minimum value of 15. A positive attitude toward maternal and child health is identified as a score of 45 or higher, while a score less than 44 is defined as a negative attitude.

In the final section, a set of 14 questions are employed to examine the practices of participants in relation to maternal and child health in pharmacies. A Likert scale consisting of a series of questions, each offering a range of responses that encompass both positive and negative sentiments. These responses were assigned numerical values, with "almost always" corresponding to 5, "frequently" to 4, "sometimes" to 3, "seldom" to 2, and "always never" to 1. It was expected that all inquiries will attain a highest possible score of 70 and a lowest value of 14. A score of 42 or higher indicated that the participants consistently engage in maternal and child healthcare practices. Conversely, a score of 29 or lower suggests insufficient regular practice of maternal and child healthcare.

3.4. Statistical Analysis

In this study, descriptive statistics was utilized to present discrete data as frequencies and percentages. Normality test was carried using Kolmogorov Smirnov test to assess distribution. Non-normally distributed variables were represented as median and interquartile range (IQR). To assess the reliability and stability of the questionnaire scales, Cronbach alpha was calculated, Kuder and Richardson reliability test to evaluate the consistency of the knowledge scale, while Wilcoxon test and Spearman coorelation test were used to assess test-retest results. The socio-demographic profile of the participants was then compared to their KAP levels using

the Chi-square test to examine potential associations. Furthermore, Pearson correlation analysis (r) was conducted to assess the strength of relationships between ranked continuous variables. Pearson correlation analysis is conducted to explore the relationships between KAP variables.

4. RESULTS

4.1. Socio- Demographic Characteristics of the study participants

From the total of 750 community pharmacy professionals contacted, 430 participants agreed to fill out the questionnaire, and 408 participants fill it completely. The characteristics of the participants are given in Table 4.1. Of the 408 community pharmacists 343 (84,1%) were females, while only 65 (15.9%) were males. The mean age of community pharmacists who completed the survey was 38.10 years.

The distribution of qualifications among community pharmacists indicates that out 408 participants, 337 (82.8%) held a graduate degree and 70 (17.2%) held a postgraduate degree.

Among the participants, there were 145 (35.6%) pharmacists with less than 5 years of professional experience, 187 (45.8%) pharmacists with experience ranging from 5 to 20 years, and 76 (18.6%) pharmacists with more than 21 years of experience in the field.

A total of 335 pharmacists dispensed a quantity of 100 or fewer prescriptions per day. Of the remaining 66 pharmacists were found to handle a range of 100 to 499 prescriptions, while a smaller group of 7 participants managed 500 or more prescriptions on a daily basis.

Table 1. Socio-demographic characteristics of community pharmacy Professional

		Frequency	Percent (%)
Gender			
	Male	65	15.9
	Female	343	84.1
	Total	408	100
Qualification			
	Graduate	338	82.8
	Postgraduate	70	17.2
	Total	408	100
Experience			
	Less than 5 years	145	35.6
	From 5 to 20	187	45.8
	≥ 21 years	76	18.6
	Total	408	100
Average number of			
	≤ 100	335	82.1

prescriptions per day	101-499	66	16.2
	≥500	7	1.7
	Total	408	100

4.2. Psychometric properties of the tool:

Thirty pharmacists were enrolled to participate in the pilot study. Participants were asked to respond to the study tool in two occasions separated by 8 days.

The Intraclass Correlation Coefficient (ICC) of attitude, was computed to be 0.833. The 95% confidence interval for this measure ranged from 0.706 to 0.922 with a significance level of >0.001.

For practice, ICC was also calculated and yielded a value of 0.801. The 95% confidence interval for this measure ranged from 0.497 to 0.921 with a significance level of >0.001.

Table 2. Intraclass Correlation Coefficient of attitude and practice towards maternal and child health

			95% Confidence Interval	
		Intraclass Correlation[b]	**Lower Bound**	**Upper Bound**
Attitude	Average Measures	.833c	0.706	0.922
Practice	Average Measures	0.801	0.497	0.921

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.

In Table 3. The Cronbach's Alpha for attitude scale is 0.871, demonstrating a strong degree of reliability. Similarly, a Cronbach's Alpha of 0.823 for practice indicates a reasonably high level of internal consistency.

Table 3. Cronbach's Alpha of attitude and practice towards maternal and child health

	Cronbach's Alpha
Attitude	0.871
Practice	0.823

4.3. Kuder and Richardson (KR) Formula 20 Test

As shown in table 4, The KR reliability coefficient of the "Contraceptive and Sexual Health" knowledge domain is approximately 0,412, which shows a moderate internal consistency. The KR reliability coefficient for "Maternal and Antenatal" was 0,480, for "Neonatal and Child Care" is 0,377, and for "Infant Growth Assessment" is approximately 0,448, suggest a moderate degree of correlation.

Table 4. Kuder and Richardson reliability coefficients for knowledge in different subject areas

Subjects	**Kuder and Richardson result**
Contraception and Sexual Health	0,41
Maternal and antenatal	0,48
Neonatal and Child Care	0,37
Infant growth assessment	0,45

4.4. Knowledge of community pharmacy professionals in maternal and child health services:

With a total of 408 participants in the study, the results indicated that the average knowledge score of the pharmacists was 6.37+/-1.686. Figure 2.

On the investigation of participants' knowledge regarding the hormones present in combined oral contraceptives, such as Yasmin and Marvelon. Among the entire sample of 408 participants, a significant majority of 375 individuals (91.9%) accurately provided the desired response. In contrast, it was observed that 33 participants, comprising 8.1% of the total sample,

provided responses that were deemed incorrect. A total of 67 individuals, representing 16.4% of the sample, demonstrated awareness regarding the reliance of contraceptive methods' effectiveness on the client's ability to utilize them accurately. Out of the total sample size, 341 individuals, accounting for 83.6%, were found to be unaware.

A total of 269 participants, accounting for 65.9% of the sample, demonstrated knowledge regarding the interaction between enzyme inducers such as Rifampicin, Lopinavir/Ritonavir, and Nevirapine with oral contraceptives. A total of 139 individuals, accounting for 34.1% of the participants, were found to be unaware. 184 respondents, constituting 45.1% of the participants, provided the correct response regarding the minimum number of antenatal clinic visits that a pregnant woman should have and a total of 224 respondents, accounting for 54.9% of the sample, provided incorrect answers.

For initiating antiretroviral (ARV) therapy in newly diagnosed Human immunodeficiency viruses (HIV) positive pregnant women Among the respondents, a total of 178 individuals, accounting for 43.6% of the sample, provided the correct response regarding the appropriate timing. Conversely, 230 respondents, representing 56.4% of the sample, provided an incorrect response. A total of 109 respondents, accounting for 26.7% of the sample, provided correct answers on non-teratogenic substances, but 299 individuals, accounting for 73.3% of the total sample, did not provide the correct answer.

Three hundred and twenty-one individuals, accounting for 78.7% of the sample, provided the correct response regarding the definition of Minimum (Exclusive) breastfeeding (BF). Conversely, 87 respondents, constituting 21.3% of the sample, provided an incorrect answer. Fifty-one individuals, accounting for 12.5% of the sample, provided accurate responses regarding deworming agents. Additionally, a significant proportion of 357 individuals (87.5%) were not accurate. From the total number of participants, 139 individuals, accounting for 34.1% of the sample, provided accurate responses regarding the treatment of mastitis. Conversely, 269 participants, constituting 65.9% of the sample, provided incorrect responses.

Out of the total number of participants, 342 individuals, accounting for 83.8% of the sample, provided correct responses regarding the utilization of head circumference (HC) measurements. Conversely, 66 participants, constituting 16.2% of the sample, provided incorrect responses. 289 (70.8%) responded positively to being able to accurately measure neonate (0-12 month) height, while 119 (29.2%) responded negatively. 274 (67.2%) of respondents were familiar with the term mid-upper arm circumference (MUAC), while 134 (32.8%) were not.

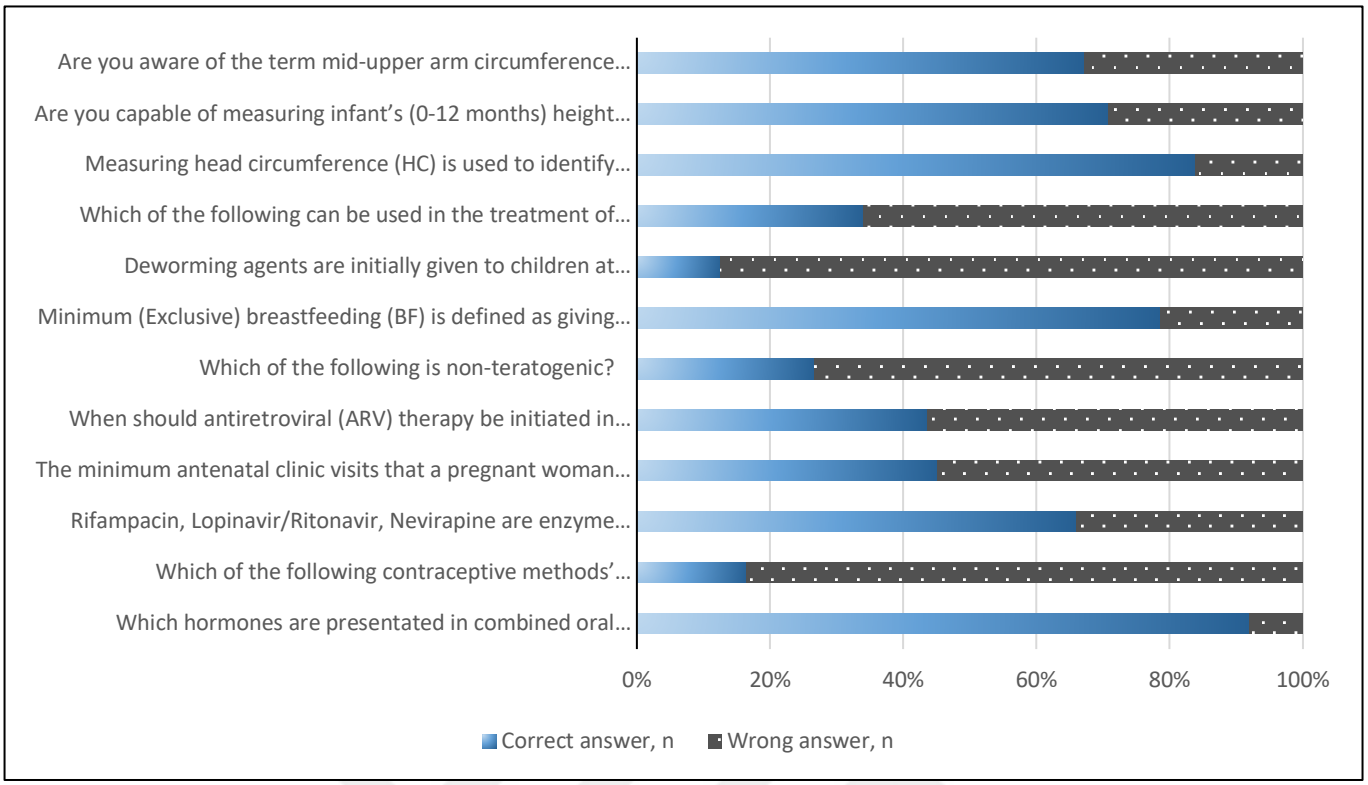


Figure 2. knowledge percentage distribution and mean levels of community pharmacy professionals in maternal and child health services

4.5. Attitude of community pharmacy professionals in maternal and child health services.

The findings indicated that the mean Attitude score achieved by the pharmacists was 59.16. The calculated value for the standard deviation was determined to be 6.979. Shown in Figure 3.

The mean and standard deviation for emergency contraceptive pills were 4.10 +/- 0.969, and for addressing unsafe abortions and reducing maternal mortality rates, the values were 4.26 +/- 0.848. Pharmacists scored 4.04 +/- 1.015 in providing information on sexually transmitted infections and 4.38 +/- 0.670 on the potential dangers of certain dietary supplements during pregnancy. Their responsibility to inform pregnant women about FDA medications scored 4.37 +/- 0.640, and prioritizing the safest medication during pregnancy had a score of 4.44 +/- 0.612. Community pharmacists' role in addressing health and drug-related issues in vulnerable patients, such as pregnant women, received a mean score of 3.72 +/- 0.958. The significance of completing training to be effective healthcare advisors for pregnant women was indicated by a mean score of 3.76 +/- 0.909.

Concerning infant and child care, pharmacists scored 4.22 +/- 0.748 in counseling women about the benefits of breastfeeding and 4.20 +/- 0.729 in encouraging patients to adhere to their medication regimens. The significance of providing advice on specific causes of malnutrition in children and neonates received a mean score of 4.13 +/- 0.783, while age-appropriate feeding recommendations scored a mean of 3.96 +/- 0.965.

Lastly, the pharmacist's responsibility to notify a mother of her child's growth assessment results were 3.54 +/- 1.125.

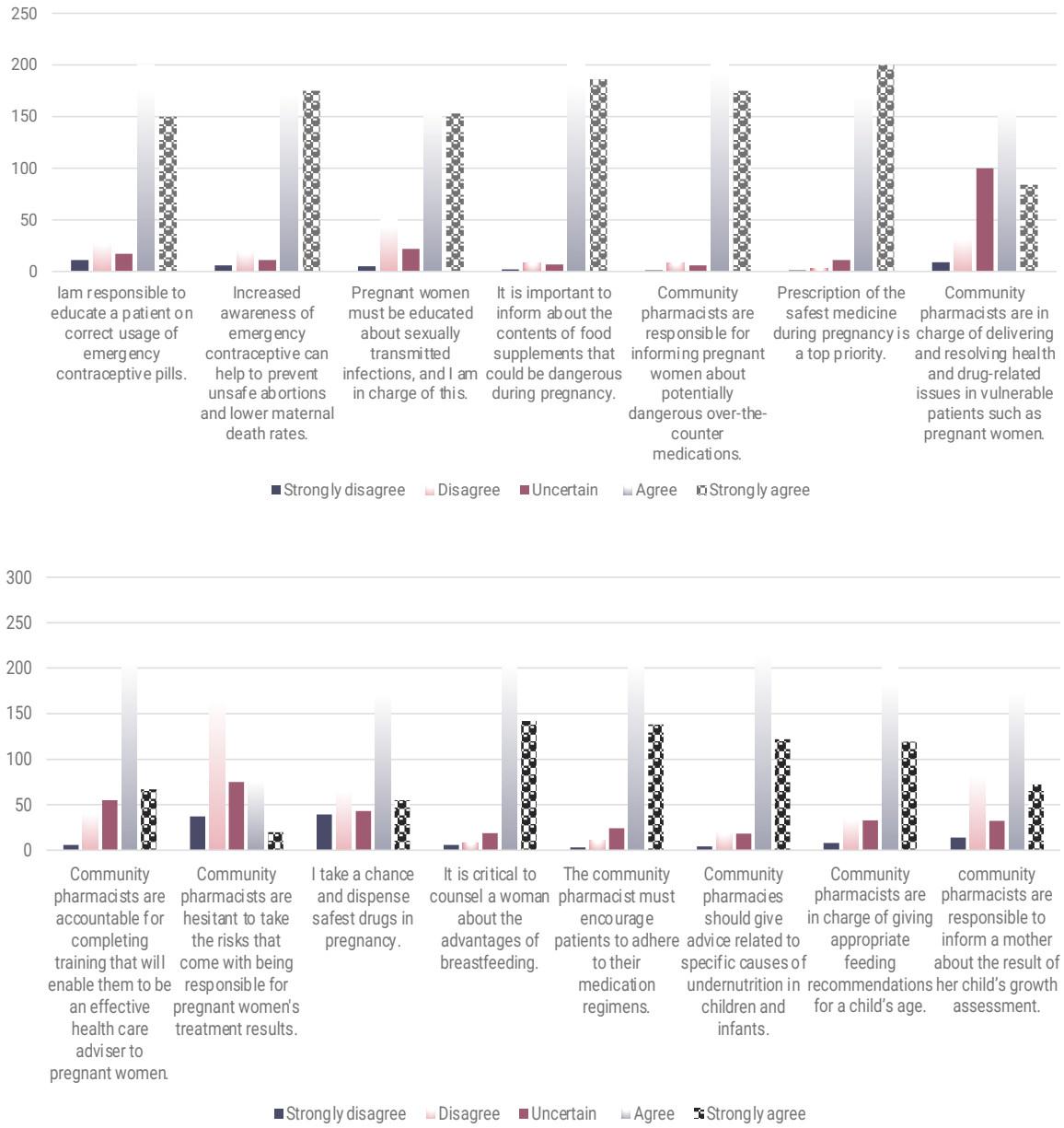


Figure 3. Attitude percentage distribution and mean levels of community pharmacy professionals in maternal and child health services (N=408)

4.6. Practice of community pharmacy professionals in maternal and child health services

The findings revealed that the mean practice score attained by the pharmacists was 48.32. The standard deviation, which quantifies the variability of practice scores relative to the mean, was computed as 9.573. Figure 4.

Figure 4 presents mean and standard deviation scores for various aspects of pharmacists' practices. Pharmacists scored 3.65 +/- 1.045 in delivering information on contraceptive care, 3.77 +/- 1.193 in addressing patients' sexual needs, and 3.92 +/- 1.102 in explaining emergency contraceptive pill usage and safety. They demonstrated a mean score of 3.97 +/- 0.881 in supporting pregnant individuals and 3.86 +/- 0.951 in offering guidance and counseling to pregnant individuals. Recommendations for Folic Acid and Iron supplements scored 3.89 +/- 1.087, and confidence when dispensing prescription medications compared to other types scored 3.96 +/- 0.821. Confidence levels for providing advice on FDA-classified medications scored 3.19 +/- 1.075 and identifying developmental abnormalities in children scored 3.12 +/- 1.035. Provision of suitable feeding recommendations based on a child's age scored 3.02 +/- 1.063. In relation to breastfeeding support, pharmacists scored 3.24 +/- 1.054 for offering guidance and counseling, and 3.25 +/- 1.040 for addressing medication and health-related issues for breastfeeding women. Confidence was lower at 2.90 +/- 1.204 when conducting medication reviews and formulating plans for neonatal and pediatric populations. Pharmacists scored 2.57 +/- 1.130 for weighing and recording a child's weight.

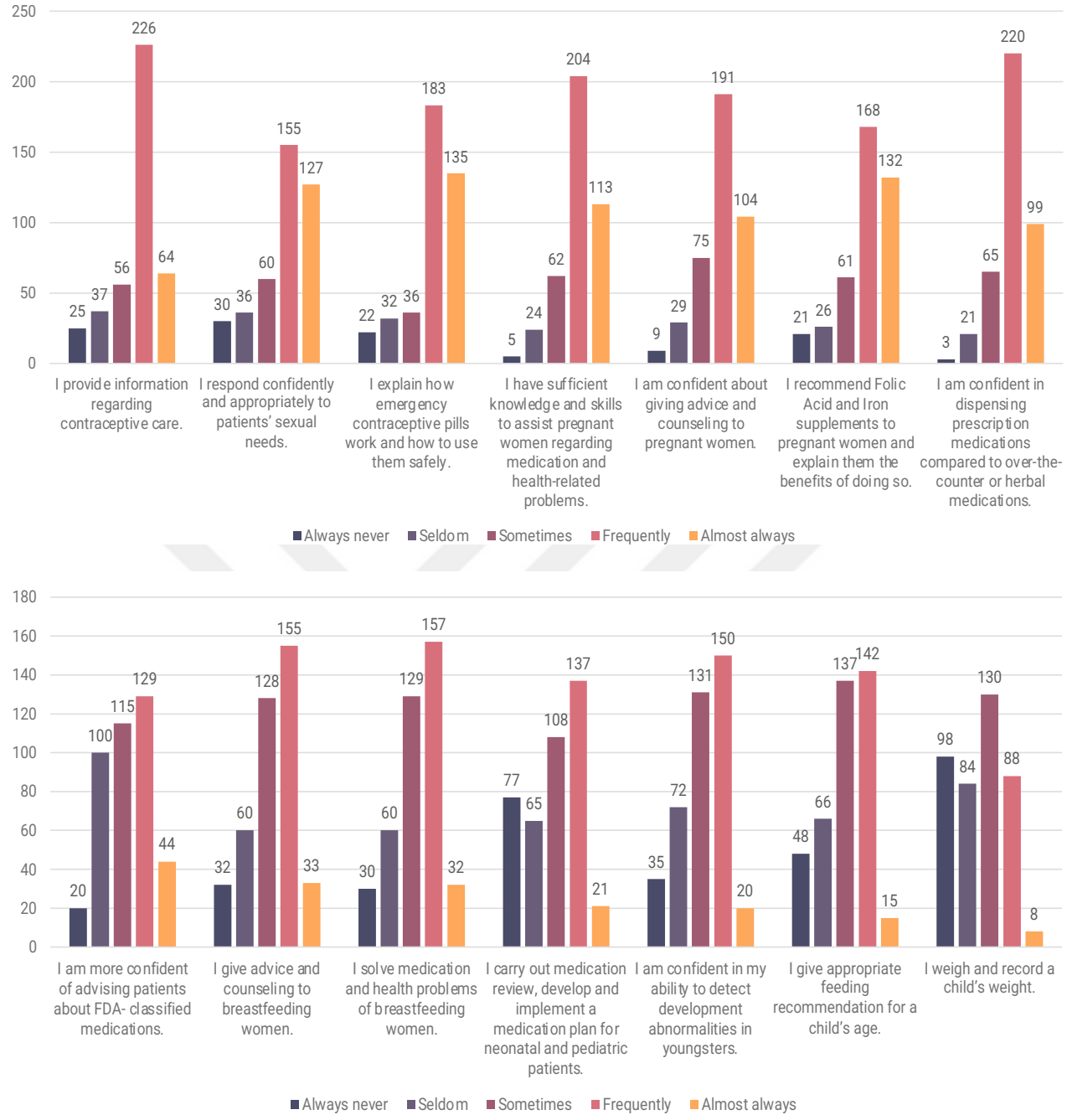


Figure 4. Practice percentage distribution and mean levels of community pharmacy professionals in maternal and child health services (N=408)

Table 5. One-Sample Statistics for Age, Knowledge scale, Attitude scale and Practice scale

	N	Mean ± Std	Median	Minimum	Maximum
Age	408	38.1005 (11.06280)	36.0000	20	76
K_scale	408	6.37 (1.686)	6.00	1	11
A_scale	408	59.16 (6.979)	61.00	19	75
P_scale	408	48.32 (9.573)	51.00	14	65

Table 6. presents group statistics for the knowledge, attitude, and practice categorized by gender. For the knowledge variable, there were 65 male participants with a mean score of 5.88 and a standard deviation of 1.755. In contrast, there were 343 female participants with a higher mean score of 6.46 and a standard deviation of 1.659.

Regarding the attitude variable, male participants (N=65) had a mean score of 58.35 with a standard deviation of 6.487, while female participants (N=343) had a slightly higher mean score of 59.32 with a standard deviation of 7.067.

For the practice variable, male participants (N=65) obtained a mean score of 47.02 with a standard deviation of 8.481. On the other hand, female participants (N=343) had a slightly higher mean score of 48.56 with a standard deviation of 9.759.

Table 6. Group Statistics for knowledge, practice, and attitude by gender

	Gender	N	Mean	Std. Deviation	Sig.
K_scale	Male	65	5.88	1.755	.878
	Female	343	6.46	1.659	
A_scale	Male	65	58.35	6.487	.618
	Female	343	59.32	7.067	
P_scale	Male	65	47.02	8.481	.003
	Female	343	48.56	9.759	

Table 7. shows the group statistics of KAP based on respondents' qualification levels.

In the "Graduate" group (N=338), the mean score for knowledge is 6.28 with a standard deviation of 1.712. The mean score for the "Postgraduate" group (N=70) is 6.80, with a standard deviation of 1.490.

In the "Graduate" group (N=338), the mean score on the variable attitude scale is 58.91, with a standard deviation of 7.220. The mean score for the "Postgraduate" group (N=70) is 60.37, with a standard deviation of 5.559.

In the "Graduate" group (N=338), the mean score for the practice variable is 47.88, with a standard deviation of 9.797. The mean score for the "Postgraduate" group (N=70) is 50.41, with a standard deviation of 8.153.

Table 7. KAP group statistics based on respondents' levels of education.

Group Statistics

	Qualification	N	Mean	Std. Deviation	Sig.
K_scale	Graduate	338	6.28	1.712	.211
	Postgraduate	70	6.80	1.490	
A_scale	Graduate	338	58.91	7.220	0.33
	Postgraduate	70	60.37	5.559	
P_scale	Graduate	338	47.88	9.797	0.52
	Postgraduate	70	50.41	8.153	

In the Table 8. The results revealed significant positive correlations between the following variables.it shows a moderate positive correlation between knowledge and attitude ($r = 0.229$, $p < 0.001$). There is also a positive correlation between knowledge and practice ($r = 0.309$, $p < 0.001$). comparatively attitude and practice have a strong positive correlation ($r = 0.638$, $p < 0.001$).

Table 8. Pearson correlation analysis between KAP

		K_scale	A_scale	P_scale
K_scale	Pearson Correlation	1	.229**	.309**
	Sig. (2-tailed)		< 0.001	< 0.001
	N	408	408	408
A_scale	Pearson Correlation	.229**	1	.638**
	Sig. (2-tailed)	< 0.001		< 0.001
	N	408	408	408
P_scale	Pearson Correlation	.309**	.638**	1
	Sig. (2-tailed)	< 0.001	< 0.001	
	N	408	408	408

4. DISCUSSION

This study focuses on the preparedness and practice of community pharmacy professionals in Türkiye regarding maternal and child health. This study aimed to evaluate the knowledge, attitude, and practice of community pharmacist in relation to maternal and child health services in Istanbul, Türkiye since appropriate use and management of medications in pregnancy is an essential component of parental care and pregnant women health.

The study's findings suggest that the community pharmacists who took part in the research exhibited a lack of adequate knowledge regarding maternal and child health. despite their limited knowledge, the community pharmacists demonstrated an upbeat attitude and exhibited commendable practices pertaining to maternal and child health. The findings of this study indicate that although there is potential for enhancing knowledge, the optimistic attitude and proactive behavior exhibited by pharmacists have the potential to positively impact maternal and child health outcomes within their professional capacities.

Community pharmacists play a vital role in the management of medication utilization during pregnancy, as they often serve as the initial point of contact and the ultimate healthcare provider that patients interact with following the receipt of a prescription. Pharmacists have the potential to contribute to the prevention of drug-related complications through the evaluation of the probability of fetal exposure and the examination of prescriptions to identify instances of dosage inaccuracies and potential drug interactions [5].

Limited research has been conducted on the knowledge, attitude, and practice of community pharmacists regarding maternal and child health, specifically focusing on the distinct components of reproductive and sexual health, maternal and antenatal care, and neonatal and child care [6,30,86,87].

The results of the study indicate that pharmacists may have a tendency toward self-centeredness. It is clear from this that, compared to men in the same age range, a greater proportion of female participants (84.1%), who were between the ages of 20 and 76, expressed interest in the study. This could mean that they were more focused on their personal maternity goals. Research was out in the United States (USA) and a multi-country survey involving Canada, Uganda, and Qatar similarly observed a greater involvement rate among female participants. The evaluation of community pharmacists' medical expertise and services in relation to mother and child health was the main goal of these research [88–90]. It is not always the case that women who are very interested in research have superior knowledge and abilities related to maternity and child healthcare. The current study makes this clear by finding no relationship between knowledge scores and covariates like age, gender, or other variables.

Similar findings were made in a cross-national study that looked at how pharmacists provided healthcare services for mothers and children. It found that participant knowledge and abilities were not significantly affected by variables such as age, gender, or parental status. Women who were pregnant or nursing were more likely to talk about their issues with female pharmacists than with male pharmacists, according to a different study done in Kuwait that focused on community pharmacists who served these women [91].

The study findings suggest that there may be gaps in knowledge among the participants on specific topics, which could have implications for their practice and the quality of care provided to patients.

The high percentage of correct answers (ranging from 65.9% to 91.9%) indicates that a considerable number of participants demonstrated good knowledge on certain aspects, such as the hormones present in combined oral contraceptives, the interaction of certain medications with oral contraceptives, and the definition of exclusive breastfeeding.

However, some questions received a relatively low percentage of correct answers (ranging from 12.5% to 43.6%), indicating areas where participants lacked knowledge or provided incorrect information. For instance, the question related to the initiation of antiretroviral therapy in newly diagnosed HIV positive pregnant women received a lower percentage of correct answers.

Comparing our research data to that of others, a study was conducted in November 2014 to assess the level of knowledge among pharmacists regarding therapeutics in the field of maternal-fetal medicine in three countries: Canada, Qatar, and Uganda. The findings indicated that the average score on the knowledge assessment was 53.7%. This finding suggests that the collective knowledge pertaining to maternal-fetal medicine in the three countries examined is relatively low [90].

A recent study conducted in October 2021 aimed to evaluate the knowledge, attitudes, and practices of community pharmacists concerning medication safety for pregnant women. Their result indicated that there is a lack of adequate knowledge among community pharmacists regarding medication safety during pregnancy. A significant percentage of pharmacists showed limited awareness of drug safety during pregnancy, particularly in relation to FDA drug risk categories and teratogens. Many pharmacists were unsure about the safety of certain drugs during pregnancy, and some even believed that drugs with potential risks, such as valproic acid and phenobarbitone, were safe for pregnant women [87].

Study published in 2017 regarding knowledge of community pharmacists about the risks of medication use during pregnancy reveals that community pharmacists have inadequate knowledge in providing information about the safety of medications used during pregnancy. This lack of knowledge may lead to suboptimal counseling and advice provided to pregnant women, potentially putting their health and the health of their unborn babies at risk [86].

Furthermore, Knowledge findings of a cross sectional study conducted in 2019 indicates that most of the community pharmacists are aware of teratogens (84.8%), which are substances that can cause birth defects in fetuses. However, their knowledge regarding specific pregnancy risk categories (5.4%) and safe use of certain prescription drugs (14.4%), non-prescription drugs (11.1%), and herbal drugs (8.9%) during pregnancy is relatively low. This suggests that there are gaps in their knowledge regarding the safety of medications used during pregnancy, which could potentially lead to inappropriate or unsafe dispensing practice [6].

On the other hand, the findings from the analyzed articles revealed that community pharmacists play a significant role in maternal health services. They are involved in providing various services such as breastfeeding guidance, counseling pregnant women on the importance of taking vitamins, offering advice on emergency contraception, and addressing symptoms like back pain. In terms of child health, community pharmacists were found to be involved in providing advice on managing acute diarrhea in children. They also played a role in medication use services and counseling related to medications for children [3].

Despite their involvement, the review identified several barriers that hindered the provision of MCH services by community pharmacists. These barriers included perceived consumer attitudes, issues with insurance coverage, lack of time among pharmacists, and a lack of incentives for providing these services [3].

Another study done in Ethiopia indicates that community pharmacy professionals are actively involved in providing various child health services. The most common services they offer are 'advising about vitamins/supplements', 'advising about infant formula/milk', and 'responding to minor symptoms'. These findings suggest that community pharmacy professionals play a crucial role in promoting child health and wellbeing in the country [89].

The findings from the study revealed that community pharmacists exhibited a positive attitude towards the subject under evaluation. The calculated mean Attitude score was 59.16, equivalent

to approximately 74.88% of the maximum possible score. This indicates that, on average, pharmacists demonstrated a favorable and encouraging attitude towards the maternal and child health. A higher percentage of the maximum score suggests a more optimistic and supportive disposition among pharmacists regarding maternal and child health. Such positive attitudes are vital in ensuring that pharmacists approach their professional roles with enthusiasm and empathy, ultimately benefiting patient care and healthcare outcomes.

Comparing to the study on 2021, their data indicates that most pharmacists have a positive attitude towards medication safety towards pregnancy. They agree that extra caution is required while dispensing drugs during pregnancy, and they acknowledge that not all over-the-counter drugs are safe for pregnant women. The majority of pharmacists also recognize that only some drugs are proven teratogens, and they are cautious about dispensing antibiotics to pregnant women. Additionally, many pharmacists are confident in dispensing the safest drugs for pregnant women [87].

Attitude findings of a cross sectional study conducted in 2019 showed that the majority of community pharmacists have a positive attitude towards safe medication use during pregnancy. They "strongly agree" and "agree" with various statements related to safe medication use during pregnancy, indicating a willingness and eagerness to provide appropriate and safe medication counseling to pregnant women [6].

The results of the study unveiled that community pharmacists scored an average of 48.32, equivalent to approximately 69% of the maximum possible practice score, in the realm of maternal and child health. This signifies that, on average, pharmacists demonstrated a satisfactory level of practice in this specific area of healthcare.

Opposing our result of practice, the overall practice finding of the finding of 2021 study indicated that there are several areas of concern regarding community pharmacists' practices related to safe medication use during pregnancy. Additionally, a notable proportion of pharmacists do not regularly update their knowledge about safe medication dispensing in pregnancy and fail to consult drug information resources for unknown drugs before dispensing to pregnant women [87].

The practice result of a cross sectional study conducted in 2019 showed that a significant proportion of community pharmacists have inadequate and potentially unsafe practices related to medication use during pregnancy. The study found that a considerable number of pharmacists dispense drugs to pregnant women without prescriptions, which can be risky as it may lead to inappropriate medication use and potential harm to the mother and fetus. Also, a

notable percentage of pharmacists do not regularly update their knowledge about safe medication dispensing during pregnancy [6].

Strength and limitation of the study:

This study was the first to assess the knowledge, attitude, and practices of community pharmacists regarding maternal and child health using a comprehensive questionnaire covering all major areas while attaining good psychometric properties.

Due to time constraints, we were unable to conduct a competency assessment using beside self-reported measures an objective structured clinical evaluation or simulated patients, which may further validate the study tool and provide more objective assessment of competency.

Participants may intentionally misrepresent their information or not disclose certain details due to social unreliability or fear of judgment, which may bias study outcomes.

Recommendation:

Community pharmacists should be encouraged to participate in regular and structured continuing education programs that focus on maternal and child health. Developing and implementing standardized protocols and guidelines for community pharmacists regarding the safe use of medications during pregnancy and for children can enhance their practice. Pharmacy schools and training programs should consider incorporating specialized courses or modules on maternal and child health in their curriculum. This can better prepare future pharmacists to provide high-quality care for pregnant women and children.

5. CONCLUSION

In conclusion, the study highlights that community pharmacists exhibited favorable attitudes and practice. However, it was observed that their level of knowledge pertaining to maternal and child health was inadequate. This underscores the persistent need to enhance the knowledge, attitudes, and practices of community pharmacists in Istanbul, Türkiye, with regards to maternal and child health. These findings underscore the importance of ongoing education and training for pharmacists to enhance their expertise in this critical area of healthcare. By addressing these gaps, community pharmacists can play a more effective role in promoting safe and optimal medication use during pregnancy, ultimately contributing to improved maternal and child health outcomes in the community.

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8. APPENDICES

8.1. Ethical Approval

Ethical approval of the study was accepted by; Yeditepe University Clinical Researches Ethical committee (202204Y0231).

8.2. Questionnaire

Knowledge, attitude and practice of community pharmacists in Maternal and child health services

SECTION 1: <u>Demographic data of Respondents</u>

Demographics	**Gender**	Female	Male	
	Age			
	Nationality			
	Qualification	**Diploma in pharmacy**	**Bachelor's in pharmacy**	**Master's in pharmacy**
	Experience	Less than 5 years	From 5 to 20	≥ 21 years
	Average number of prescriptions dispensed per day	**≤ 100**	**101-300**	**≥500**

		A	B	C	D	E
Knowledge	1. Which hormones are presented in combined oral contraceptive for example yasmin, marvelon?	Estrogen and progestogen	Testosterone and oxytocin	Prolactin and oxytocin	Prolactin and oxytocin	I don't know
	2. Which of the following contraceptive methods' effectiveness relies on the client's ability to use them correctly?	Vasectomy	Condoms	Intrauterine device (IUD)	Sub-dermal implant	I don't know
	3. Rifampicin, Lopinavir/Ritonavir, Nevirapine are enzyme inducers that interact with oral contraceptives to …….	Reduce contraceptive effect	Increase contraceptive effect	Stabilize contraceptive effect	Terminate contraceptive effect	I don't know
	4. The minimum antenatal clinic visits that a pregnant woman should have is…….	2	4	6	8	I don't know
	5. When should antiretroviral (ARV) therapy be initiated in newly diagnosed HIV positive pregnant women?	Immediately HIV status is confirmed	CD4 count <500 cells/mm3	Viral load <1000 IU/ml	Immediately after birth	I don't know
	6. Which of the following is non-teratogenic?	ACE inhibitors (lisinopril, captopril, etc)	Vitamin A derivatives	Statins (crestor, lipitor, etc)	None of the above	I don't know
	7. Minimum (Exclusive) breastfeeding (BF) is defined as giving only breast milk to infants for the first ……. Of life	2 months	4 months	6 months	12 months	I don't know
	8. Deworming agents are initially given to children at ……., subsequently every ……	6 months, 6 months	6 months, 12 months	12 months, 6 months	12 months, 12 months	I don't know
	9. which of the following can be used in the treatment of mastitis?	Apply warm compresses	Drink plenty of clear water	Paracetamol	Antibiotics	All of the above
	10. Measuring head circumference (HC) is used to identify neonates who are at risk of ……	Hemolytic disorders	Neurodevelop mental disorders	Prematurity	Respiratory dysfunction	I don't know
	11. Are you capable of measuring infant's (0-12 months) height correctly?	Yes		No		

	12. Are you aware of the term mid-upper arm circumference (MUAC)?	Yes	No

		Strongly disagree	Disagree	Uncertain	Agree	Strongly Agree
Attitude	13. I am responsible to educate a patient on correct usage of emergency contraceptive pills.					
	14. Increased awareness of emergency contraceptive can help to prevent unsafe abortions and lower maternal death rates.					
	15. Pregnant women must be educated about sexually transmitted infections, and I am in charge of this.					
	16. It is important to inform about the contents of food supplements that could be dangerous during pregnancy.					
	17. Community pharmacists are responsible for informing pregnant women about potentially dangerous over-the-counter medications.					
	18. prescription of the safest medicine during pregnancy is a top priority.					
	19. Community pharmacists are in charge of delivering and resolving health and drug-related issues in vulnerable patients such as pregnant women.					
	20. Community pharmacists are accountable for completing training that will enable them to be an effective health care adviser to pregnant women.					
	21. Community pharmacists are hesitant to take the risks that come with being responsible for pregnant women's treatment results.					
	22. I take a chance and dispense safest drugs in pregnancy.					
	23. It is critical to counsel a woman about the advantages of breastfeeding.					
	24. The community pharmacist must encourage patients to adhere to their medication regimens.					
	25. Community pharmacies should give advice related to specific causes of undernutrition in children and infants.					
	26. Community pharmacists are in charge of giving appropriate feeding recommendations for a child's age.					
	27. community pharmacists are responsible to inform a mother about the result of her child's growth assessment.					

		Always never	Seldom	Sometimes	Frequently	Almost always
Practice	28. I provide information regarding contraceptive care.					
	29. I respond confidently and appropriately to patients' sexual needs.					
	30. I explain how emergency contraceptive pills work and how to use them safely.					
	31. I have sufficient knowledge and skills to assist pregnant women regarding medication and health-related problems.					
	32. I am confident about giving advice and counseling to pregnant women.					
	33. I recommend Folic Acid and Iron supplements to pregnant women and explain them the benefits of doing so.					
	34. I am confident in dispensing prescription medications compared to over-the-counter or herbal medications.					
	35. I am more confident of advising patients about FDA- classified medications.					

36. I give advice and counseling to breastfeeding women.						
37. I solve medication and health problems of breastfeeding women.						
38. I carry out medication review, develop and implement a medication plan for neonatal and pediatric patients.						
39. I am confident in my ability to detect development abnormalities in youngsters.						
40. I give appropriate feeding recommendation for a child's age.						
41. I weigh and record a child's weight.						

8. CURRICULUM VITAE

Personal Informations

Name	Sonita	**Surname**	Anwari

Education

Degree	**Department**	**The name of the Institution Graduated From**	**Graduation year**
Master	Clinical Pharmacy	**Yeditepe University**	
University	Clinical Pharmacy	**Gulf Medical University**	2018
High school	-	**Lisa Naswan Zaranj**	2009

Languages	**Reading***	**Speaking***	**Writing***
English	Very good	Very good	Very good
Dari	Very good	Very good	Very good
Pashto	Very good	Good	Very Good
Hindi	Good	Very Good	Good
Türkish	Good	Good	Good

Work Experience

Position	**Institute**	**Duration (Year - Year)**
Pharmacist Intern	Thumbay Hospital Ajman	2018

Computer Skills

Program	**Level**
Microsoft Office Programs (Word, Excel, PowerPoint)	Very good

***Excellent , good, average or basic**