OFP

Osteopathic Family Physician

THE OFFICIAL PEER-REVIEWED PUBLICATION OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS

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Official Notice to the ACOFP Membership

Proposed Amendments to the ACOFP Constitution & Bylaws

Draft as of September 28, 2018

CONSTITUTION

According to the Constitution of the American College of Osteopathic Family Physicians, Inc.

Article IX – Amendments: Section 1. *This Constitution may be amended at any annual meeting of the Congress of Delegates by a three-fourths vote of the total number of delegates credentialed for voting, provided that the proposed amendment shall have been filed with the Executive Director of the College at least 60 days before the first day of the meeting of the Congress of Delegates and that the Executive Director shall have notified the membership of the College in writing of the proposed amendment at least 30 days preceding the first day of the meeting of the Congress of Delegates.*

Section 2. *All amendments to the Constitution shall not be effective until they are submitted to and approved by the Board of Trustees of the AOA.*

The ACOFP Board proposes the following amendments to the Constitution to allow Medical Doctors (MDs) to be Active Members of the ACOFP, as recommended by the 2018 ACOFP Congress of Delegates. Approval of the amendments will be voted on at the ACOFP Congress of Delegates at its March 21, 2019 meeting. If adopted by the ACOFP Congress of Delegates, approval will be sent to the American Osteopathic Association Board of Trustees for approval. (New material in all caps and old material in strike out.)

CONSTITUTION OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS, INC.

ARTICLE II – MISSION & OBJECTIVES

Section 2

The objectives of the College are:

3. To support high standards of ongoing osteopathic education for ~~osteopathic~~ family physicians;

5. To encourage and improve the educational opportunities for the training of ~~osteopathic~~ family physicians in all branches of osteopathic medicine and surgery, including the osteopathic family medicine training programs WITH OSTEOPATHIC RECOGNITION STATUS;

ARTICLE IV – MEMBERSHIP

The membership of this College shall consist of osteopathic family physicians, ALLOPATHIC FAMILY PHYSICIANS and such other persons who have met the requirements of membership prescribed by the ACOFP Bylaws.

ARTICLE VII - BOARD OF GOVERNORS

Section 1.

The Board of Governors shall be composed of the President, President-Elect, the Past Presidents for the preceding two years, Vice President, Secretary/Treasurer, six (6) Governors-at-large, one osteopathic RESIDENT GOVERNOR OR ALLOPATHIC Resident Governor IN OSTEOPATHIC FOCUSED EDUCATION AT A FAMILY MEDICINE RESIDENCY WITH ACGME OSTEOPATHIC RECOGNITION STATUS, one osteopathic Student Governor, and the Speaker of the Congress of Delegates, all to be selected as provided in the Bylaws. The Speaker has voice but no vote.

BYLAWS

According to the Bylaws of the American College of Osteopathic Family Physicians, Inc.

Article XVI - *Amendments Section 1. Notification. These Bylaws may be amended at any annual meeting of the Congress of Delegates by a two-thirds vote of the total number of delegates credentialed for voting, provided that the proposed amendment shall have been filed with the Executive Director of the College at least 60 days before the first day of the meeting of the Congress of Delegates and that the Executive Director shall have notified the membership of the College in writing of the proposed amendment at least 30 days preceding the first day of the meeting of the Congress of Delegates.*

Section 2. *Approval. An amendment to these Bylaws shall not be effective until they are submitted to and approved by the Board of Trustees of the AOA.*

The ACOFP Board proposes the following amendments to the Bylaws to allow Medical Doctors (MDs) to be Active Members of the ACOFP as recommended by the 2018 ACOFP Congress of Delegates, to create a Student Delegation in the ACOFP Congress of Delegates, and to include the Distinguished Fellow designation in the Bylaws. Approval of the amendments will be voted on at the ACOFP Congress of Delegates at its March 21, 2019 meeting. If adopted by the ACOFP Congress of Delegates, approval will be sent to the American Osteopathic Association Board of Trustees for approval. (New material in all caps and old material in strike out.)

BYLAWS OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS, INC.

ARTICLE III – MEMBERSHIP

Section 1. Qualifications

An applicant for membership, except as provided herein, shall be a graduate of a college of osteopathic medicine approved by the American Osteopathic Association OR A GRADUATE OF A COLLEGE OF ALLOPATHIC MEDICINE APPROVED BY THE LIAISON COMMITTEE ON MEDICAL EDUCATION at the time of graduation and shall be licensed to practice ~~osteopathic~~ medicine. Each applicant shall be of good moral character, and shall conform to the ACOFP Code of Ethics.

Section 3. Active Members in Good Standing

The phrase "in good standing" shall describe only those active members whose dues and assessments are current, and who document CME hours ~~earned within a three-year period of educational programs~~ consistent with the AOBFP OR AMERICAN BOARD OF FAMILY MEDICINE (ABFM) requirements, and who are in compliance with the ACOFP Code of Ethics. National officers, affiliate officers, and residency program directors must be members in good standing.

ARTICLE V - CONGRESS OF DELEGATES

Section 1. Composition

A. The ACOFP Executive Director shall provide to the Secretary of each ACOFP affiliate society in writing the number of delegates to which that Society is entitled at least 60 days before the first day of the annual meeting of the Congress of Delegates.

(1) Each affiliate society shall be entitled to at least one voting delegate, who shall be a member in good standing, and shall be entitled to an additional voting delegate for every 25 members thereafter, or the majority fraction thereof, active members, plus one voting delegate from each approved undergraduate chapter located within the geographic boundaries served by the ACOFP affiliate society. IN ADDITION, A SEPARATE STUDENT SOCIETY SHALL REPRESENT THE STUDENT ASSOCIATION OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS (STUDENT ASSOCIATION OF THE ACOFP) AND BE ENTITLED TO ONE VOTING DELEGATE AND ONE ALTERNATE DELEGATE APPOINTED ANNUALLY BY THE PRESIDENT OF THE STUDENT ASSOCIATION OF THE ACOFP FROM WITHIN THE STUDENT RESOLUTIONS COMMITTEE, WITH APPROVAL FROM THE NATIONAL STUDENT EXECUTIVE BOARD.

(4) Each affiliate society shall be entitled to one voting ~~osteopathic~~ family medicine resident delegate who meets the following criteria.

(a) Be currently enrolled and in good standing in an AOA or ACGME residency program in the state which the delegate represents.

(b) Be a member in good standing of the ACOFP affiliate society in the state (if such an affiliate society exists).

(c) Be a member in good standing with ACOFP ~~and AOA~~.

ARTICLE VI - BOARD OF GOVERNORS

Section 2. Composition

A. The Board of Governors shall consist of the President, President-Elect, the Past Presidents for the preceding two years, Vice President, Secretary/Treasurer, six (6) Governors-at-large, one Osteopathic RESIDENT GOVERNOR OR ALLOPATHIC Resident Governor IN OSTEOPATHIC FOCUSED EDUCATION AT A FAMILY MEDICINE RESIDENCY WITH ACGME OSTEOPATHIC RECOGNITION STATUS, and one Osteopathic Student Governor as provided for in the Bylaws.

Section 6. Duties

The duties of the Board of Governors shall be:

I. To approve the granting of the designation "Fellow of the American College of Osteopathic Family Physicians (FACOFP). AND "DISTINGUISHED FELLOW OF THE AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS (FACOFP *dist.*)."

ARTICLE X - DEPARTMENTS & COMMITTEES

Section 2. Qualifications of ~~Standing~~ Committee CHAIRS AND Members

~~Standing c~~Committee chairs ~~and committee members~~ shall be OSTEOPATHIC PHYSICIANS WHO ARE active members of this College in good standing, or academic or associate members of this College~~.~~, OR ALLOPATHIC PHYSICIANS WHO MEET THESE REQUIREMENTS AND HAVE COMPLETED OSTEOPATHIC FOCUSED EDUCATION AT RESIDENCY PROGRAMS WITH ACGME OSTEOPATHIC RECOGNITION STATUS.

COMMITTEE MEMBERS SHALL BE OSTEOPATHIC OR ALLOPATHIC PHYSICIANS WHO ARE ACTIVE MEMBERS OF THIS COLLEGE IN GOOD STANDING, OR ACADEMIC OR ASSOCIATE MEMBERS OF THIS COLLEGE.

OFFICIAL CALL • 2019 CONGRESS OF DELEGATES OF THE ACOFP

You are hereby notified that the ACOFP Congress of Delegates will convene on March 20 - 21, 2019 at the Sheraton Grand Chicago hotel in Chicago, Illinois.

Credentialing of Delegates and Alternate Delegates will take place on the afternoon of Wednesday, March 20 before the start of Session I, and Session II which will convene on the morning of Thursday, March 21. Each ACOFP Affiliate State Society shall certify the names of its Delegates and Alternate Delegates to the ACOFP Executive Director by February 15, 2019.

Any reports, resolutions, or other business for this meeting should be submitted by February 15 to Annie DeVries at annied@acofp.org so that they can be posted on the ACOFP website and available to Delegates to review in advance.

Elizabeth A. Palmarozzi, DO, FACOFP
Speaker of the Congress of Delegates

Rocky Mountain OPTI/Sky Ridge Medical Center

Neuromusculoskeletal Medicine + 1 Residency

Our program was established to enable physicians who have already completed a residency in an approved specialty to spend an extra year enhancing their skills in neuromusculoskeletal medicine and osteopathic manipulative medicine (NMM/OMM). Our goal is to develop highly trained physicians who can act as both clinicians and academicians. Our program places a significant emphasis on the integration of osteopathic manipulative medicine and the principles of primary care sports medicine. Our residents develop their Osteopathic clinical skills by providing inpatient care at Sky Ridge Medical Center and outpatient care at the Rocky Vista Health Center and other associated outpatient clinics.

Our program also includes such rotation choices as neurological surgery, occupational medicine, orthopedic spine surgery, podiatric medicine, primary care sports medicine, neurology, physical medicine and rehabilitation, rheumatology, musculoskeletal radiology, medical acupuncture, family medicine, integrative medicine, functional medicine, hospice and palliative care, internal medicine, obstetrics and gynecology and pediatrics. Academic development occurs through the Rocky Vista University College of Osteopathic Medicine in Parker, Colorado. Successful program completion will allow the physician to apply for the Neuromusculoskeletal Medicine/Osteopathic Manipulative Medicine certification examination.

Kenneth A. Ramey, DO, FACOFP serves as the program director and is a 1994 graduate of the Chicago College of Osteopathic Medicine. He is board certified in family medicine/osteopathic manipulative treatment, neuromusculoskeletal medicine/osteopathic manipulative medicine and has a certificate of added qualification in sports medicine. Dr. Ramey is a member of the medical staff at Sky Ridge Medical Center and has served as a team physician at the high school, college and semi-professional levels. He is an Associate Professor of OPP at Rocky Vista University and serves as the Director of the Sports Medicine and Osteopathic Manipulative Medicine Program at the Rocky Vista Health Center.

We have received ACGME Pre-Accreditation and would be honored to consider your application for our program. Please send a current CV, letter of interest and three letters of recommendation (including one from your residency director) to Dr. Ramey at kramey@rvu.edu. Please call Dr. Ramey at (720) 874-2421 if you need additional information.

"The purpose of Osteopathy is to make life a little more comfortable for the patient."

"What are the limits of Osteopathy? No one knows the limits of Osteopathy."

John Martin Littlejohn, DO

Guide for...

READERS

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EXAM SCHEDULE

CERTIFICATION & OCC (RECERTIFICATION)

AOBFP EST. 1972

EXAMS	LOCATIONS	POSTMARK DATE
Family Medicine / OMT Certification / OCC Performance Evaluation Only	**ACOFP Annual Convention** **Chicago, IL** March 21 - 24, 2019 exam dates TBD	**October 1, 2018** *Late fee through December 1*
Family Medicine / OMT Certification / OCC Cognitive Exam	**Electronic Testing** Regional Sites May 4, 2019	**October 1, 2018** *Late fee through December 1*
Family Medicine / OMT Certification / OCC Cognitive Exam	**Electronic Testing** Regional Sites September 28, 2019	**April 1, 2019** *Late fee through June 1, 2019*
Family Medicine / OMT Certification / OCC Performance Evaluation Only	**AOA OMED Conference** Fall, 2019 exam dates TBD	**April 1, 2019** *Late fee through June 1, 2019*

AMERICAN OSTEOPATHIC BOARD OF FAMILY PHYSICIANS
If you have questions, please call 847.640.8477 or email aobfp@aobfp.org.

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OFP SEARCHING FOR 2019 STUDENT PEER REVIEWER INTERNS

RESPONSIBILITIES:

- Familiarity with OFP editorial standards and compliance with those standards.
- Dependability – Be responsible, prompt, and maintain attention to details.
- Communicate – Interact in a professional manner. Be direct, kind and concise.
- Respect the confidentiality inherent in the review process.
- A good article takes 1–3 hrs to review and a flawed article may take up to 10 hrs.
- You will be asked to peer review at least 1 article during the 2019 journal year.
- Be a current COM student in good standing.
- You will be provided with peer reviewing how to's and evaluations by OFP editors throughout the year.

*Please email **belindab@acofp.org** your CV with the subject line "Student Peer Review Intern." You will be asked to sign a letter of commitment that outlines your duties and professional expectations.*

2018 STUDENT ACADEMIC & PEER REVIEW WRITING INTERNS

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OFP SEARCHING FOR 2019 STUDENT WRITING INTERNS

RESPONSIBILITIES:

- Familiarity with OFP editorial standards and compliance with those standards.
- Dependability – Be responsible, prompt, and maintain attention to details.
- Communicate – Interact in a professional manner. Be direct, kind and concise.
- Respect the confidentiality inherent in the review process.
- Be a current COM student in good standing.
- Available for a 8am EST conference call with the OFP editors on a predetermined Friday to discuss, rank and decide which articles will be slated to a bimonthly issue for OFP; choose an image for the cover of a bimonthly issue; choose a topic for patient education handout.

*Please email **belindab@acofp.org** your CV with the subject line "Student Writing Intern." You will be asked to sign a letter of commitment that outlines your duties and professional expectations.*

OFP
Osteopathic Family Physician
JOURNAL

2019 CALL FOR PAPERS

Osteopathic Family Physician is the ACOFP's official peer-reviewed journal
The bi-monthly publication features original research, clinical images and articles about preventive medicine, managed care, osteopathic principles and practices, pain management, public health, medical education and practice management.

RESERVE A TOPIC

Reserve a review article topic today by emailing ACOFP Managing Editor, Belinda Bombei at belindab@acofp.org. Please provide your name and the review title you would like to reserve. Once you reserve a review article topic, you will receive an email confirmation from ACOFP. This will initiate a three-month deadline for submission. If the paper is not received within three months, the system will release the review article topic for other authors to reserve. Articles submitted for publication must be original in nature and may not be published in any other periodical. Materials for publication should be of clinical or didactic interest to osteopathic family physicians. Any reference to statistics and/or studies must be footnoted. Material by another author must be in quotations and receive appropriate attribution. ACOFP reserves the right to edit all submissions. Visit ofpjournal.com to view author guidelines, policies, and manuscript checklist.

CLINICAL IMAGES

We are seeking clinical images from the wards that covers essential concepts or subject matter to the primary care physician.
Please provide a brief synopsis of how the case presented along with 1-4 questions and approximately 1 page of education with reference to the image and questions.

REVIEW ARTICLE TOPICS

- ADHD Management in Primary Care: with osteopathic component
- Disorders of Puberty: An Approach to Diagnosis and Management with an osteopathic component
- Detecting, Managing, and Treating Patients with Personality Pathology in Primary Care Settings with an osteopathic component
- OMT Treatments for Pediatric Conditions: A Systematic Review with an osteopathic component
- CPPD: Uncommon and Under-Recognized with an osteopathic component
- Chronic Kidney Disease: Detection and Evaluation with an osteopathic component
- Direct Primary Care: Emerging Practice Alternative with an osteopathic component
- Diagnosis and Management of Non-Melanoma Skin Cancer with an osteopathic component
- Update on Office-Based Strategies for the Management of Obesity with an osteopathic component

RESEARCH TOPICS

We are seeking original clinical or applied research papers. Original contributions include controlled trials, observational studies, diagnostic test studies, cost-effectiveness studies, and survey-based studies. The OFP will accept basic scientific research only if the work has clear clinical applications. For randomized controlled trials, study flow diagrams must be submitted. For all other types of original contributions, flow diagrams are encouraged. Original contributions should be 3000 words with no more than 50 references and 5 tables or figures. OFP requires you to submit a 250-word abstract, along with four to six keywords.

The content should include the following:

Abstract
Introduction
Methods
Results
Discussion
Conclusions
Acknowledgments

Ronald Januchowski, DO, FACOFP
Editor-in-Chief

Paula Gregory, DO, MBA, CHCQM, FAIHQ
Associate Editor

acofp AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS

EDITOR'S MESSAGE

Comfort in Uncomfortable Situations

Ronald Januchowski, DO, FACOFP, Editor, *Osteopathic Family Physician*

These are exciting times to be in osteopathic family medicine! The opening of numerous osteopathic medical schools, consolidation in graduate medical education under ACGME, changes in Medicare fee schedules, and the decoupling of AOA membership related to board certification are just a few events that create excitement in our profession, but at the same time can cause uneasiness and an uncomfortable feeling. Preventing fear from dictating our next move requires an ability to become comfortable with feeling uncomfortable.

I have seen "helicopter" and "lawnmower" parents making it difficult for individuals to develop the emotional and coping skills required to manage the uncomfortable feelings in business, academics, and personal affairs. I would encourage you to rally around conflict and discomfort to help set a great course for osteopathic family medicine in the next few years. Be a part of positive change in the profession and embrace doing something different – you may find it to be motivating and enjoyable.

I do not think that we need to recite St. Crispin's Day speech (the speech King Henry V of England gave to rouse his soldiers and made famous the phrase "band of brothers) every day in our lives. However, by banding together with a great group of Osteopathic Family Physicians with a similar mindset and goals, we can influence our own lives, patients, and the profession for years to come. May your uncomfortable situations be a little nicer than the one show below experienced by SEAL trainees!

There are great articles in this issue of OFP. Highlighting the relationship between the viscera and the musculoskeletal system is seen in the brief report section. Our research and review articles demonstrate the unique nature of providing rational treatment based on osteopathic tenets. As the editorial committee finishes our push towards PubMed listing (an uncomfortable situation for those involved!), I am proud to see the unique osteopathic presentation of each of the OFP articles.

As November arrives, remember those individuals previously or currently in the service on Veterans' Day and have a Happy Thanksgiving. Enjoy the issue!

As a work of the U.S. federal government, the image is in the public domain in the United States.

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FROM THE PRESIDENT'S DESK

ACOFP Congress to Consider Opening Membership to MDs

Duane G. Koehler, DO, FACOFP *dist*.
2018 - 2019 ACOFP President

After more than two years of debate and careful consideration, the March 2019 ACOFP Congress of Delegates will consider Constitution & Bylaws Amendments to allow medical doctors (MDs) to become Active Members of the ACOFP.

The ACOFP's mission is to promote excellence in osteopathic family medicine through quality education, visionary leadership and responsible advocacy. By allowing more family physicians to join the College, we are further supporting the mission and objectives, opening more opportunities to promote osteopathic distinction and expanding the reach of our message.

"ACOFP is a community of current and future family physician that champions osteopathic principles and supports its members by providing resources such as education, networking and advocacy, while putting patients first."

The historic membership change is a result of MD graduates training in residencies with Osteopathic Recognition status that are accredited by the Accreditation Council on Graduate Medical Education (ACGME). The AOA is also opening its certification to MDs, as the AOA and ACGME are less than two years from a complete transition to the ACGME Single Accreditation System. To grow ACOFP membership, we believe the ACOFP should also be giving MD graduates the opportunity to be involved in osteopathic professional organizations.

HISTORY OF THE TRANSITION

The 2016 ACOFP Congress of Delegates directed the Board to consider changes to the Constitution & Bylaws to allow MDs in residency programs with Osteopathic Recognition status to become Active Members.

The Board welcomed comments from members regarding the important decision to allow MDs to be members, stating, "This is YOUR specialty society and YOUR decision." ACOFP then sent a survey to members and key constituencies including students, residents, committees, Fellows, the Auxiliary, Past Presidents and state societies. The survey asked members for opinions on three models of membership. From the 343 responses, there was no clear consensus:

- 29% for Status Quo
- 31% for Hybrid with Conditions
- 28% for Full Parity for MDs

The Board did not choose one of the models because the survey results were so close, but instead made recommendations on 17 aspects of membership.

FACTORS FOR CONSIDERATION WITH MD MEMBERSHIP

There will be NO change to the organization name, mission statement or vision statement of ACOFP.

Active Member Status – The Board recommends that ACOFP accept MDs as Active Members with criteria that parallels the criteria for DOs to be accepted. However, the Board recommends that there be additional conditions regarding items such as MDs being nominated to the Board, serving as a Committee Chair and being nominated as a Fellow, among others.

The ACOFP definition of an osteopathic physician – This does not change, but it now includes, "An MD may practice osteopathically, but an MD is not an osteopathic physician."

Board Criteria for Officer and Governor – An MD must demonstrate commitment to osteopathic family medicine, with the decision being made by the ACOFP Nominating Committee for each individual.

Board Criteria for Resident Governor and Residents Council – An MD resident who is an active trainee at a family medicine residency with ACGME Osteopathic Recognition status may be nominated.

Board Criteria for Student Governor – An MD is not eligible due to lack of osteopathic training.

Committee Participation – ACOFP will accept MDs on Committees, including the right to vote. However, for the Committee Chair positions, only those MDs who have completed osteopathic focused education at a residency with ACGME Osteopathic Recognition status can be appointed.

Congress of Delegates – MDs can be members.

State Societies – Individual states are to determine whether to allow MD membership in their society and the extent of their rights and privileges.

Student Chapters – The Board makes no recommendation at this time.

ACOFP Fellow & Distinguished Fellow Criteria – The Board defers to the Conclave of Fellows to make a recommendation on whether MDs can become Fellows and Distinguished Fellows.

Award Criteria – Qualified MDs can be nominated for all ACOFP awards.

Membership in the Auxiliary to the ACOFP – Membership in the Auxiliary shall be open to all family and friends of those who qualify for ACOFP membership.

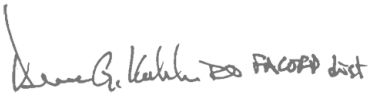
Auxiliary Student Scholarship Criteria – The Board defers to the Auxiliary to make a recommendation for the student scholarship criteria.

The ACOFP Constitution & Bylaws/Policy & Organization Review Committee used these factors to add "MD" and "allopathic family physician" wording where applicable to the proposed Amendments to the Constitution & Bylaws. The Constitution & Bylaws state that ACOFP must notify members of such changes 30 days in advance of the next Congress, which will be in March 2019. Congress will vote on whether to approve the Amendments at the ACOFP '19 Convention.

You can read all the proposed Amendments in this *OFP* issue.

We hope the inclusion of medical doctors in our College will be the beginning of a positive era of collaboration, education and networking with a large new group of family physicians.

Osteopathically Yours,



Duane G. Koehler, DO, FACOFP *dist*.
2018 - 2019 ACOFP President

RESEARCH ARTICLE

How Women Choose Prenatal Care Providers in the Twin Tiers

Alicia Harbison, DO, PGY-2[1]; Michael Gillan, DO[1]

1. Robert Packer Hospital

KEYWORDS:

Midwives

Obstetrics

Prenatal Care

Women's Health Issues

Objective: There are three main options for women seeking prenatal care: Obstetricians (OB), Midwives (MW), and Family Medicine physicians (FM). This study aims at determining how women choose prenatal care providers, at what point in pregnancy women choose their provider, what factors guide their choice, if women would repeat their choice, and if they know that FM can provide prenatal care.

Methods: A list of obstetrical patients who delivered at Institute Name between June 1, 2015, and May 31, 2016, was obtained from Epic, institute's electronic medical record. Patient exclusion criteria: patients under the age of 18 during delivery, patients who delivered stillbirths, patients that had died since delivery, and deaf patients who may not be able to participate in a phone call. Surveys were conducted via phone during normal business hours. Descriptive statistics were used to summarize survey data.

Results: A total of 212 patients were surveyed; average age of a participant was 27 years old. On average, they had 3 pregnancies of which 2 resulted in live births. The majority of patients saw an OB for care. Women chose based off recommendations and prior usage. Most women selected a provider during the trimester they discovered pregnancy. Of the 88 patients who received survey 1, 52% were aware FM can perform prenatal care and 50% were willing to see FM for care.

Conclusion: A significant number of women are willing to see FM for prenatal care. FM should receive additional prenatal training and exposure to prenatal patients.

INTRODUCTION

A woman's choice of provider plays an important role in her pregnancy by sharing information, resolving concerns, providing access to resources, and administering care during childbirth.[1] Therefore, it is important that women make an informed decision on who they select for prenatal care.

There are three main prenatal care options for women: OB (Obstetricians), MW (Midwives), and FM (Family Medicine physicians). MWs provide more direct support during the laboring process while OBs rely more on nurses to provide direct care.[2] This has resulted in two distinct models of care: a Medical Model and a Midwifery Model.[1] OBs use the Medical Model, which views pregnant women and their unborn child as being potentially at a medical risk, leading to increased monitoring of pregnancy. MWs utilize the Midwifery Model which emphasizes wellness and focuses on women making their own decisions about pregnancy, generally refraining from costly interventions. FMs tend to use a blend of both models, frequently take care of the patient before becoming pregnant, and both patients after delivery.[1,3]

When women search for a prenatal care provider, they use personal and impersonal sources.[1] Personal sources include: prior use of the provider, recommendations from family and friends, providers with similar values, and female gender. Impersonal or system sources include: recommendations from physicians, insurance coverage, advertisements, or assignment.[3] Women tend to select prenatal providers quickly without considering alternate practitioners.[4]

Important characteristics women consider when selecting a provider include: good communication skills, time commitment, participation in decisions, being respectful, feeling valued, empathy, and provider expertise.[1,4] Other valued aspects encompass ease of scheduling, flexible clinic hours, emotional support, and tending to the psychosocial aspects of their lives.[5] Having a meaningful relationship between patient and provider makes it easier for a patient to accept guidance from providers.[5]

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This study aims to increase understanding of how women choose prenatal care providers. The main objectives of this study are: 1) to determine the factors that influence how pregnant women choose their prenatal care provider; 2) to determine how women choose between a MW, OB or FM for prenatal care; 3) to determine when women discovered their pregnancy and when they first saw a prenatal care provider; 4) to determine if women are aware that they can use a FM provider for prenatal care; 5) to determine if women would be willing to change their provider type.

METHODS

An IRB-approved, descriptive survey study was conducted to assess how women choose prenatal care. Study participants were recruited from Institute Name, a 254-bed tertiary care teaching hospital in Sayre, Pennsylvania that serves the regions of the Northern Tier of Pennsylvania and the Southern Tier of New York, also known as the Twin Tiers. This is a rural underserved region of the country. Institute is part of the Guthrie Health Care System, a not-for-profit, integrated health care organization. A list of obstetrical patients with infants delivered between June 1, 2015 and May 31, 2016 at Institute was obtained from Epic, Institute's electronic medical record. Inclusion criteria: the mothers of all infants delivered between June 1, 2015 and May 31, 2016 at Institute. Exclusion criteria: patients under the age of 18 during delivery, patients who delivered stillbirths, patients that had died since delivery, and deaf patients who may not be able to participate in a phone call. The eligible participants were called on the phone, by the author and medical students from a private room, to determine interest in participation in a research study. An individual who granted verbal consent would be given the survey. Each potential subject would be contacted up to three times between the hours of 8am and 5pm. After three missed attempts, that woman was excluded. If the interview with a woman stopped abruptly, and she was willing to continue at a later time, then a continuation call would occur. The patients would be asked to answer questions based on their prenatal care experience *(Survey 2, page 15)*. Patients could withdraw from the study by refusing the phone call, ending the call prematurely, or skipping questions. Patient data was collected on Institute secure computers.

About halfway through data collection, the last two questions were changed to address a patient concern. The original survey *(Referred to as Survey 1)* questions "Would you ever consider seeing a Family Doctor?" and "Did you know that Family Doctors can do prenatal care?" were revised in what is referred to as Survey 2 to read, "Since you saw (OB/MW/FM) for prenatal care, would you ever consider seeing either of the two remaining providers?"

Statistical analysis was performed using the computer program, R studio Version 1.0.136 and R version 3.3.1.

RESULTS

Initially, 845 patients were reported. Of those, 26 patients were excluded from participation as follows: duplicate patients (mothers of twins were counted once instead of twice, 6), underage patients (9), those who delivered stillbirths (8), 2 patients had since died after delivery, and one patient was deaf and excluded due to the nature of the phone survey, giving a total of 819 potential patients. A total of 212 patients completed the survey, which represents 25.9% of eligible patients that delivered over the year *(Figure 1)*.

GENERAL CHARACTERISTICS

Of the 212 patients surveyed, the youngest was 18 and the eldest was 44. The average age of patient at delivery was 27.2 years. The highest gravity (number of times a woman has been pregnant)

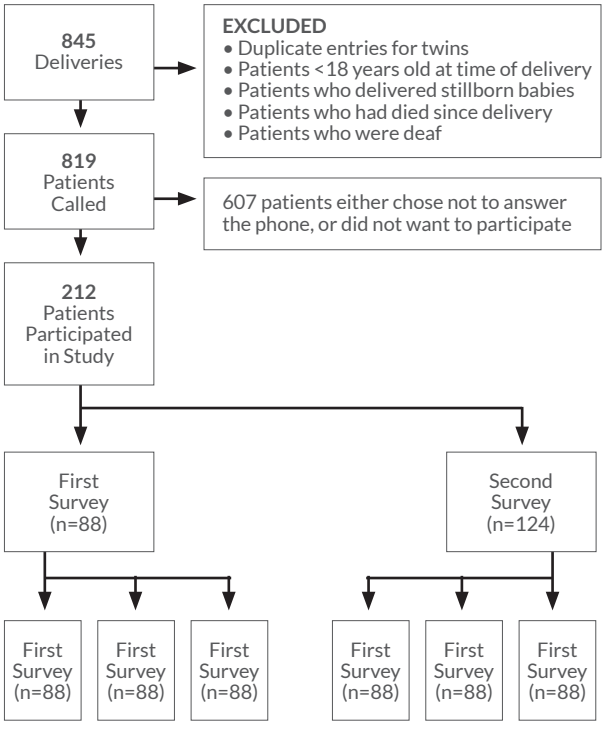
TABLE 1:

Provider type and whether a recommendation was how the provider was selected. Bottom half compares OB with combination of FM and MW.

Category	Patient Did Not Choose Provider Based On Recommendation	Patient Did Choose Provider Based On Recommendation
FM	15	4
MW	53	16
OB	77	47
FM/MW	68	20
OB	77	47

FIGURE 1:

Flowchart of how patients were selected.



was 11 with an average of 3.1, and the highest parity (number of times a woman delivered) was 9 with an average of 2.4. About 66% of pregnancies led to live births, which is consistent with literature.[6,7] Survey 1 was completed by 88 patients and survey 2 was completed by 124 patients. There were a total of 70 MW patients (33%), 123 OB patients (58%) and 19 FM patients (8.9%).

HOW WOMEN CHOOSE PROVIDERS FOR CARE

The responses to the question: "How did you choose (provider name)?" showed 32% of providers were chosen from a recommendation and 25% of providers were selected from a prior pregnancy. Most of the 32% of providers that were chosen from a recommendation were OB. There was an insignificant relationship between the individual provider type and a recommendation for initial usage (p = 0.06343). Analyzing OB compared to the other two providers combined (MW/FM), there was a significant relationship of provider type and recommendations for initial usage (p = 0.02838) *(Table 1, see page 11)*.

Another question, "What did you like about (provider name)?" investigated desired characteristics in a provider. Examples of preferred characteristics include: their provider's personality, thoroughness, knowledge, amount of time spent with patient, personability, addressing concerns, and mannerisms. For MW responses included, using fewer medications, wanting a more natural childbirth, or being holistic.

For the question, "Would you recommend family members or friends to use a/an (OB/MW/FM)?" 94% of patients stated they would recommend their provider type. There was an insignificant relationship between provider type and whether the patient would refer provider type (p = 0.2069) *(Table 2)*.

A relationship was identified between the provider and if the patient would consider seeing another provider type (p = 0.03446). Patients which selected FM had the largest proportion of patients willing to see another provider type, which occurred in 7 of 8 cases. Patients that selected MW had the lowest proportion of patients willing to see another provider, 17 of 43 *(Table 3)*. No relationship was identified between if a provider was initially recommended and if the patient would recommend the same provider to others (p = 1).

To determine if a patient would continue with their same provider was analyzed via the question, "Would you use the same provider again?" The relationship between the question and provider type was evaluated and was insignificant (p = 0.07911). There was a marginally significant relationship between whether a provider would be selected again when comparing OB to the other providers. The proportion of OB providers which would not be seen again is higher than the other provider types combined (p = 0.0631) *(Table 4)*.Data was evaluated to determine if a two-way correlation existed between if a provider would be reselected and if the provider clearly explained tests, procedures, and if the patient felt comfortable communicating concerns with the provider. A correlation was identified for all variables.

- Clearly explain procedures and select provider again: p = 9.999e-05
- Clearly explain tests and select provider again: p = 0.0012
- Felt comfortable communicating concerns and select provider again: p = 3e-04

Similar correlations were evaluated for the data for whether a provider would be recommended:

- Clearly explain procedures and recommend provider: p = 2e-04
- Clearly explain tests and recommend provider: p = 5e-04
- Felt comfortable communicating concerns and recommend provider: p = 3e-04

TABLE 2:

Provider type and whether the provider would be recommended to family and friends. Bottom half compares OB with combination of FM and MW.

Category	Patient Would Not Recommend	Patient Would Recommend
FM	0	19
MW	2	67
OB	10	114
FM/MW	2	86
OB	10	114

TABLE 3:

Provider type and whether the patient would consider using another provider.

Category	Patient Would Not Recommend	Patient Would Recommend
FM	1	7
MW	26	17
OB	35	38

TABLE 4:

Provider type and whether the provider would be used again. Bottom half compares OB with combination of FM and MW.

Category	Patient Would Not Use Again	Patient Would Use Again
FM	0	19
MW	2	67
OB	12	112
FM/MW	2	86
OB	12	112

AT WHAT POINT IN PREGNANCY WOMEN CHOOSE THEIR PROVIDER

Women typically selected providers the same trimester in which they discovered pregnancy *(Table 5)*.

TABLE 5:

Trimester that a woman discovered pregnancy in comparison with when she saw a provider for the initial visit.

Trimester Discovered Pregnancy	Trimester Patient Saw A Provider			
	Unknown	1	2	3
Unknown	1	0	0	0
1	3	191	9	2
2	0	0	4	0
3	0	0	0	2

PATIENT'S AWARENESS OF USING FM FOR PRENATAL CARE

In Survey 1, the questions, "Would you ever consider seeing a Family Doctor?" and "Did you know that Family Doctors can do prenatal care?" were asked. Patients answered "yes" 50% of the time and 52% of the time, respectively.

In Survey 2, the new question asked the participants if they would consider seeing any of the provider types (OB/MW/FM) that they had not already met. Results were, 49 patients answered no (40.5%), 35 patients answered yes to all provider types (28.9%), 6 answered only if needed (5%), 4 were unsure of seeing other providers (3.3%), 4 had already seen all three providers (3.3%), 10 would consider switching to a MW (8.3%), 13 would consider switching to a FM (10.7%), and 0 would consider switching to an OB (0%).

DISCUSSION

The two largest factors contributing to a woman selecting a provider were: recommendations (from friends, family, or doctors) and prior usage of the provider. If a woman had seen a certain provider before, they were likely to continue with that provider for subsequent pregnancies.

Most women discovered they were pregnant and sought care during the first trimester. This matches the literature, which states that on average women realized they are pregnant at 10 weeks.[8] Obstetricians were the most frequently referred specialist. Patients who had providers that explained tests and procedures and felt like they could bring up concerns were more likely to use the same provider again, or to recommend the provider to others.

Patients preferred providers that were understanding, knowledgeable, caring, honest, and made time for them. If patients desired a more medically based pregnancy, they chose a FM or an OB. If patients desired a pregnancy with fewer interventions, they chose a MW, in keeping with the current theory on models of care. While many patients who saw a provider would refer them to family members or friends, a small majority of patients who saw an OB would not refer them.

On the topic of OB, it appeared as if fewer patients would be willing to switch to an OB for care. This possibly occurred since the majority of patients saw OB initially, and therefore could not answer that they would be willing to switch to an OB for care. Another possibility is that patients who saw MW or FM would be willing to see others in general.

A sub-group analysis based on the demographics of the patients was unable to be performed. Location, race, and ethnicity were analyzed, but none of them showed any significant differences. Questions were not asked concerning income. The location of this study in the Twin Tiers is considered rural underserved.

Of the patients surveyed, about half are willing to see a FM, but only 9% went to a FM for pregnancy. If this data was to be extrapolated to fit the full prenatal patient workload, about 380 patients a year would be willing to see a FM for pregnancy. Two factors leading to such a small number of patients seeing FM for pregnancy are that the patients are unaware that FM is an option and many FMs do not offer prenatal care.

Approximately half of the patients are unaware of the possibility of a FM providing prenatal care. To increase awareness, the FM doctor should inform the patient that they do prenatal care prior to the patient becoming pregnant. FM prenatal care would fill the need of more continuity of care for the patient and their family. Since many patients see a FM doctor for primary care, they would be comfortable with that provider, and after delivery, the FM could take care of both the patient and the newborn.

Another problem is that few FMs provide prenatal care. The retention rate of prenatally trained FMs is low from the extra burdens it imposes. Tong *et al*. found that the proportion of United States FM who reported providing maternity care declined from 23.3% in 2000 to 9.7% in 2010.[9] Numerous causes for the decline of FM's taking care of prenatal patients have been identified. These include: malpractice litigation, physical exhaustion from hours needed, intimidation by new procedures, government regulations, hospital closures, stresses at home, bad outcomes, and pressure by OB-GYNs not to deliver.[10]

The trend of FM providers choosing not to offer prenatal care can lead to a lack of prenatal providers in rural regions. Graduates from OB-GYN tend to practice in urban regions, whereas FM and MW cover rural regions. Since almost 50% of counties in the United States have no OB provider, about 10 million women are unserved.[10] The FM physician needs to be educated about the population to be cared for and be strengthened if they decide to care for pregnant patients.

A strength of this study is the large sample size. Participants were sampled from all three provider types allowing them to be compared. The weaknesses include: low statistical significance for some findings, the study was performed in a rural setting with few

provider options, and the need to change the questions between Survey 1 and Survey 2 as previously discussed.

Future research should be aimed at increasing women's awareness of a FM as a prenatal care option and investigating determine how FM residents view prenatal care. A similar survey could be completed in a multicenter to assess generalizability since these surveys were completed in a rural setting. Future research could be done to determine if there are any benefits in seeing one provider over another.

LIMITATIONS

The study was performed about 1.5 to 2 years after the women delivered, and they may have had subsequent pregnancies since then. This was retrospective, leaving room for potential recall bias. There is also a possibility of social desirability bias in the honesty of their responses.

Multiple hypothesis tests were performed simultaneously without compensating for a larger type 1 error rate. The study had an adequate sample size to detect differences in proportions of up to 0.3 without compensating for the inflated type 1 error rate. Additional studies may be needed to confirm observed relationships. In this rural setting another limitation is observations may not be independent, since a single provider could represent multiple data points and bias the results.

CONCLUSIONS

Prenatal care is a momentous time in a woman's life. Providers are chosen that are knowledgeable, understanding, timely, and can help alleviate patient concerns. This study suggests that 52% of patients are aware of having a FM physician do prenatal care and 50% would be willing to see a FM physician. This suggests that there is many opportunities to expand a FM practice with prenatal and young patients, which is especially needed in rural regions.

ACKNOWLEDGEMENTS

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AUTHOR DISCLOSURES:
No relevant financial affiliations

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Follow-up Script – Prenatal Care *(Survey 2)*

Participant B#: _____ Age: _____ Date of Call: _____/_____/_____

Treating Physician or NP: ◯ *Midwives* ◯ *Obstetrician* ◯ *Family Medicine Doctor* | *Attempt #:* ◯ *1* ◯ *2* ◯ *3*

Hello, this is (Student name here), I'm a medical student working with the Guthrie Medical Group. I am working with Drs. Harbison and Gillan with the Section of Family Medicine at Guthrie. We are conducting a follow-up research study on patients who had infants born at Robert Packer Hospital from June 1, 2015-May 31, 2016. We want to evaluate how patients chose their provider for prenatal care.

Our records show that you first received prenatal on or about __/__/__ (date).
Does that sound right? ◯ Yes ◯ No

Would you mind if I ask you some questions about your treatment? This is voluntary and completely confidential, I only have 12 questions and it will take about 10 minutes of your time. ◯ Yes ◯ No

If no: *"Is there a better time for me to call you back?"* _____

If no: *"Thank you for your time."* End call.

If yes: Proceed with Questionnaire

Thank you. You can stop me at any time, or skip any questions you do not wish to answer.

1. *How far along were you when you found out you were pregnant?*
   ◯ First 3 months ◯ 3-6 months ◯ 6-9 months
2. *When in your pregnancy did you first go to the doctor for prenatal care?* _____
3. *Did you see an* ◯ *obstetrician* ◯ *a midwife* ◯ *or a family doctor for pregnancy care?*
4. *I see that you saw* (insert name of provider), *how did you choose* (insert name of provider)*?* _____
5. *What did you like about* (insert name of provider)? _____
6. *Did* (insert name of provider) *explain procedures to you in a way you understood?* ◯ Yes ◯ No
   If yes: What about the explanation made it understandable? _____
   If no: What about the explanation made it not understandable? _____
7. *Did* (insert name of provider) *explain testing to you in a way you understood?* ◯ Yes ◯ No
   If yes: What about the testing made it understandable? _____
   If no: What about the testing made it not understandable? _____
8. *Did you feel like you could bring up questions or concerns to* (insert provider name) *about your pregnancy?*
   ◯ Yes ◯ No
   If yes: What made (insert name of provider) approachable? _____
   If no: What made (insert name of provider) unapproachable? _____
9. *Would you use the same* (obstetrician/midwife/family doctor) *again?* ◯ Yes ◯ No
10. *Would you recommend to family members or friends to use a/an* (obstetrician/midwife/family doctor)?
    ◯ Yes ◯ No
11. **If the woman saw an OB for prenatal care**
    Would you ever consider seeing a family doctor or midwife for prenatal care? ◯ Yes ◯ No
12. **If the woman saw a midwife for prenatal care**
    Would you ever consider seeing an OB or family doctor for prenatal care? ◯ Yes ◯ No
13. **If the woman saw a family doctor for prenatal care**
    Would you ever consider seeing an OB or a midwife for prenatal care? ◯ Yes ◯ No

That's all of the questions I have for you. Thank you so much for your time. If you have any follow-up questions, please call our Institutional Review Board at (570) 887-4885.

RESEARCH ARTICLE

Parental Decision Making Regarding Vaccination of their Children Against HPV

Jennifer Sepede, DO[1]; Linda Boyd, DO[1]; Alison Mancuso, DO[1]

1. Rowan School of Osteopathic Medicine

KEYWORDS:

Adolescent Medicine

Cervical Cancer

Genital Warts

Human Papilloma Virus

Vaccination

Objective: To determine which factors contribute to parental decision making in order to increase childhood vaccination rates against HPV.

Methods: An IRB-approved survey was placed in the four Rowan University School of Osteopathic Medicine Family Medicine offices asking parents of children age 18 or younger to complete it. Questions focused on the age and gender of their children, their knowledge of the HPV vaccine, whether they have or will vaccinate their children if they do not intend to vaccinate their children why not, and the best way for them to obtain information about the vaccine. Results were analyzed using Fisher's exact test.

Results: 40 surveys were completed and returned. Subjects included 32 female and 8 male parents with a variety of ethnicities, levels of education, religions and current ages. Overall, 72.5% of parents with at least one daughter and 65% of parents with at least one son either had or intended to vaccinate them against HPV. Physician discussion of the vaccine did not significantly impact vaccination decisions in parents with daughters, but it did impact vaccination decisions for parents with sons. Eighty percent of parents that received physician education vaccinated or intended to vaccinate their sons. In comparison, only fifty percent of parents who did not receive education from their physician vaccinated or intended to vaccinate their sons.

Conclusion: Data collected suggested that physician education may increase parental decision to vaccinate their sons against HPV, but does not have impact on whether parents will vaccinate their daughters.

INTRODUCTION

Human Papilloma Virus (HPV) is a DNA virus, which affects the skin and mucosa of humans. There have been 170 different strains of this virus identified and good portions of these strains are transmitted through sexual contact including vaginal, anal and oral intercourse.[1] HPV can often be subclinical and show no symptoms, however it can also cause genital warts, cervical cancer, vulvar cancer, vaginal cancer, penile cancer, anal cancer and oropharyngeal cancer.[1,2] Specifically HPV 6 and 11 cause genital warts and HPV 16 and 18 cause cervical cancer.[2]

Human papilloma virus is the most common sexually transmitted disease, which affects 79 million Americans. Every year 14 million people become newly infected and most men and women have had at least one strain in their lifetime. Genital warts affect 360,000 people each year and 11,000 women are diagnosed with cervical cancer annually.[2]

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The Human Papillomavirus Quadrivalent Vaccine (HPQV) is a vaccine that prevents against HPV strains 6,11, 16 and 18 and is commercially available as *Gardasil*®.[3] The US FDA approved the use of HPQV for females ages 9-26 years old in 2006 and then approved its use for males age 9-26 years old in 2009. The CDC recommends that the vaccine be administered in ages 11-12 for both males and females.[2] The vaccine is recommended up to age 26 in females who have not been previously vaccinated and age 21 in males who have not been previously vaccinated. Males age 22-26 may be vaccinated as well.[4]

Recently, a nine valent HPV vaccine has been released and the age recommendations are the same as for HPQV, however it covers five more strains than the HPV.[2] The nine valent HPV vaccine prevents against HPV strains 6, 11, 16, 18, 31, 33, 45, 52 and 58[5,6] and is commercially available as *Gardasil*®9.[6] Before the nine valent vaccine release, vaccination against HPV was preventing 70% of cervical cancers, likely due to the immunities to HPV strain 16 and HPV strain 18, which have been identified as major causes of cervical dysplasia. By increasing the amount of HPV strains protected against in the nine valent vaccine, it is estimated to prevent against 90% of cervical cancers as opposed to the previous 70%. In a direct comparison between the quadrivalent

HPV vaccine and nine valent HPV vaccine, the efficacy of the nine valent vaccine was 96.7% for preventing cervical diseases caused by HPV 31, 33, 45, 52 and 58 and the nine valent vaccine was noninferior to the quadrivalent vaccine in producing an antibody response to HPV 6, 11, 16 and 18.[5]

Previously the HPV vaccine required three doses, but in 2016, the Advisory Committee on Immunization Practices updated the guidelines to include a two-dose option. For patients who receive their first dose of the HPV vaccine before the age of 15, only two doses of the vaccine are required and the second dose can be administered 6-12 months after the first dose. Once the patient turns 15 years old, three doses of the HPV vaccine should be administer with the second dose administered 1-2 months after the first dose and the third dose administered 6 months after the first dose.[7]

Despite the release of these vaccines, in 2016, only 65.1% of teenage girls were vaccinated with at least one dose of the HPV vaccine and only 49.5% had completed the HPV vaccination series. Vaccination rates are even lower in males. Only 56.9% of teenage males were vaccinated with at least one dose of the HPV vaccine and only 37.5% had completed the HPV vaccine series.[8] Due to these low vaccination rates, many studies have looked at reasons why the vaccination rates are so low and ways to improve vaccination rates.

A recent study debunked many misconceptions about the HPV vaccine, by showing that although many parents have fears of increased sexual activity or risky sexual behavior post vaccination, there is no evidence that this occurs. Another misconception discussed in the article was that the vaccine was new and safety was questionable, but the evidence does not support this claim either. They also discuss the major factor contributing to low vaccination rates is the failure of physicians to recommend the HPV vaccine. They concluded that in order to achieve higher rates of vaccination, they will need to focus on education of parents about the safety and efficacy of the vaccine, as well as educating health care providers on the indications for the vaccine and how to best communicate with parents the benefits of the vaccine and the possible risks related to not vaccinating their child.[9]

Another study about parental awareness of HPV vaccines compiled data from the National Health Interview Survey and looked at parents who had children age 8-17. The study found that 62.6% of US parents had heard of the vaccine. They also found that the factors of the parents that increased awareness were female gender, white race, English speaking, higher education, higher income, married and more educated. They also showed that children who had better access to preventive pediatric care were more likely to be vaccinated. The study concluded that the key to greater vaccination rates would be increased parental awareness through improving access to preventative health care for children.[10]

Similarly, a recent study used a survey questionnaire to evaluate parental acceptability of the HPV vaccine in Mysore, India where annually a large amount of women are being newly diagnosed with cervical cancer and dying from cervical cancer that the HPV vaccine could help decrease significantly. The survey showed 71% of parents were willing to vaccinate their daughters and was highest in people who felt the vaccine was safe, a good way to protect against cervical cancer and who believed cervical cancer to be a serious disease. Based on these results, they concluded that the safety of the vaccine and proven benefits in regards to cervical cancer should be emphasized to promote increased vaccination rates.[11]

It has been shown that educating parents with easy to understand materials, which highlight the benefits of HPV vaccination, as well as building trust with the parents will increase parental consent for their adolescents to participate in clinical HPV trials.[12] This data could lead to inferences that if parents are willing to let their children participate in a clinical trial on the HPV vaccine, they may be more willing to allow them to actually receive the vaccine. Also, by increasing the amount of research on the vaccine performed on adolescents, the intended recipient of the vaccines, we have more evidenced based education for parents to discuss with physicians, which help them decide whether or not to vaccinate their children.

Lastly, it has been shown that with an increase of parental HPV vaccine awareness from 72% to 77% over a four-year period, HPV vaccination rates of daughters increased from 25% to 48% in Los Angeles County.[13] Based on this data, it would support a hypothesis that improved parental education would increase vaccination rates and that current vaccination rates are lower than they should be due to lack of awareness of the vaccine and its benefits.

METHODS

An IRB-approved anonymous survey was distributed in all Rowan University School of Osteopathic Medicine Family Medicine offices at the front desk asking parents of children age 18 or younger to complete it. Family Medicine has four office locations that have patients from a variety of ethnic backgrounds, socio-economic statuses and insurance types. Inclusion criteria were adults who were able to read English with children under 18 years old. Exclusion criteria were adults who did not have children or could not read English, as the survey was only available in the English language. The consent was explained on the survey and was implied by the participant completing the survey. Results were analyzed using Fisher's exact test. Demographic information was elicited from study participants including gender, age, religion, education status, and marital status. Additional questions focused on the age/gender of their children, if the children were vaccinated in general, parental knowledge of the HPV vaccine, whether parents have or intend to vaccinate their children for HPV, reason parent will not vaccinate their children and the parent's preferred way to obtain information about the HPV vaccine. *www.acofp.org/acofpimis/acofporg/PDFs/OFP/HPVSurvey.pdf*.

RESULTS

Forty surveys were completed and returned. Subjects included 32 females and 18 males with a variety of ethnicities, levels of education, marital status, religion and current age. *(Table 1, see page 18)*

Overall, 72.5% of parents with at least one daughter and 65% of parents with at least one son either had or intended to vaccinate

TABLE 1:

Demographic Information of Parents

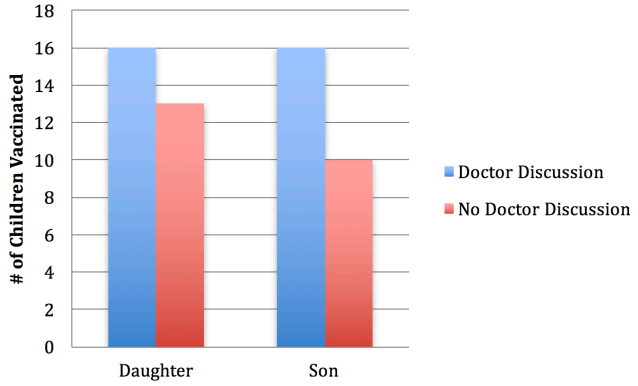
Characteristic	No. (%)
Gender	n=50
Male	18 (36%)
Female	32 (64%)
Age	n=40
21-25 y.o.	3 (6%)
26-30 y.o.	2 (4%)
31-35 y.o.	4 (8%)
36-40 y.o.	17 (34%)
41-45 y.o.	7 (14%)
46-50 y.o.	4 (8%)
No response	10 (20%)
Race	n=40
Caucasian	28 (56%)
Black	5 (10%)
Asian	1 (2%)
Hispanic	5 (10%)
Other	1 (2%)
No response	10 (20%)
Religion	n=40
Christian	15 (30%)
Catholic	15 (30%)
Muslim	2 (4%)
Other	5 (10%)
None	3 (6%)
No response	10 (20%)

them against HPV. Parents who indicated they had a discussion with a physician about the vaccine did not correlate with an increase in vaccination rates in parents with at least one daughter; however, it did correlate with an increase in vaccination rates for parents with at least one son. Eighty percent of parents that received physician education vaccinated or intended to vaccinate their sons (16 parents vaccinated their sons out of the 20 parents who received education by a physician). In comparison, only fifty percent of parents who did not receive education from their physician vaccinated or intended to vaccinate their sons (10 parents vaccinated their sons out of the 20 parents who did not receive education from their physician). **(p=0.048).** *(Figure 1)*

Vaccination preference was not significantly impacted by other factors such as parental age, education status, race/ethnicity or religion. Most participants were knowledgeable about the HPV vaccine and the majority felt that a doctor was the appropriate place to get information about the HPV vaccine; however, this knowledge did not correlate with an increase in vaccination rates within this sample size. Other reasons for not vaccinating your child besides lack of education or not having enough information on the vaccine were evaluated such as feeling the vaccine is not safe, feeling the vaccine is not needed for their child, concern that vaccination will change their child's sexual activities and in general not believing in vaccines. These other beliefs, while evaluated in the survey, did not significantly correlate with a reason for decreased vaccination rates.

FIGURE 1:

Vaccination Rates With and Without Physical Education



CONCLUSION/DISCUSSION

Survey data collected suggested that physician education may increase parental decision to vaccinate their sons against HPV, but has no significant impact on whether parents will vaccinate daughters. Other factors such as religion, concerns about safety of the vaccine, and worries that the vaccination will increase earlier and risky sexual behavior had no statistically significant impact on parental decision making regarding the HPV vaccine. Participants were knowledgeable about the HPV vaccine and the majority felt that a doctor was the appropriate place to get information about the HPV vaccine, however this knowledge did not show a significant increase in vaccination rates in our sample size. Lack of parental education may be decreasing vaccination rates in parents with sons.

In regards to parents with daughters, more investigation is necessary. In the US, females are vaccinated at higher rate likely due to multiple factors such as the vaccine was approved and marketed to females first and marketing is focused on a female disease of cervical cancer, but our study demonstrated an increase in vaccination among male children after parental education about the vaccine from their physician. These results bring up various questions such as if parents are truly well educated and informed about the HPV vaccine and that it can prevent cervical cancer, why are they not vaccinating their daughters at a 100% rate? Are there other barriers to vaccination that need further investigation?

While this study did not have a large sample size, it does provide ideas and groundwork for future studies. This study did not look at HPV vaccine series completion, just vaccination rates, which is an important area to evaluate in the future. Physician education and parental awareness may lead to increase in vaccine rates, but studies are lacking about whether it will increase the rates of vaccine series completion. Another area for future evaluation would be to examine how physicians are educating parents and which strategies may be more effective to increase vaccination rates. Physician educational efforts were not evaluated in this study, but the parents simply indicated whether their physician had discussed the vaccine with them or not. Finally, in our study we just had parents list how many sons and daughters they had and did not differentiate between families with only sons, only daughters or a combination of the two, but in the future it would

be interesting to study if there is any significant difference of vaccination rates among the groups.

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AUTHOR DISCLOSURES:
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REVIEW ARTICLE

Newborn Disorders and Nutritional Guidance

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KEYWORDS:

Cystic Fibrosis

Down Syndrome

Gastroesophageal Reflux

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Pediatrics

Newborn disorders vary widely, from premature birth to a myriad of genetic disorders. Although they are commonly encountered in hospital and primary care settings, existing therapies are neither definitive nor distinct, and research is still ongoing. Such disorders of concern include premature birth, gastroesophageal reflux, cystic fibrosis, Down Syndrome, phenylketonuria, maple syrup urine disease, and galactosemia. Nutritional recommendations are critical to these infants who may not survive without specific alterations in their diet to accommodate the stress from their metabolic demand. Nutritional guidance in these patients reduces the incidence of complications and exacerbations of these disorders, which may include failure to thrive, anemia, neurocognitive deficiencies, sepsis, reflux, and diabetes. Breastfeeding has been found to reduce mortality in infants that are premature, reduce complications in gastroesophageal reflux disease, and result in better prognoses in newborns with cystic fibrosis. Supplementation of vitamins, iron, probiotics, and even salt have been beneficial in the management of these newborns. Modified infant formulas and medical foods are the mainstay of treatment for inborn errors of metabolism, as they require specific enzymes and proteins to be supplemented or avoided. Also, knowing which milks, proteins and vegetables to consume may be valuable for physicians and primary caretakers to plan the diet regimens accordingly.

INTRODUCTION

While research in pediatric medicine has historically focused on the medical management of various newborn disorders, research regarding the long-term nutritional aspects of such disorders warrants further discussion. Insufficient nutrition in a developing newborn compounded by a pathologic process may result in a condition known as failure to thrive (FTT), a pattern of inadequate weight gain.[1] Chronic and unmanaged FTT can further progress into neurocognitive deficits and immune deficiencies, which can potentially create significant morbidity throughout the rest of the newborn's life.[2] Preparing a nutritional plan in anticipation of the infant's additional metabolic needs may help in preventing complications exacerbated by a specific newborn disorder. Family Medicine physicians often encounter these issues, and this review focuses on the importance of breastfeeding and additional nutritional components of common newborn disorders in an effort to mitigate potential progression into FTT and its long-term sequelae.

PREMATURITY

Preterm births constitute a substantial portion of childbirths in the United States and are a significant cause of infant mortality and morbidity. In 2016, the incidence of premature births increased for the second straight year to 9.85%.[3] Prematurity is defined as birth before 37 weeks and complications related to prematurity may include anemia, late onset sepsis, necrotizing enterocolitis, or failure to thrive.[1,4–6]

Iron deficiency anemia is a common complication of prematurity due to a lower level of iron stores in the preterm infant.[7] Other causes of anemia can include rapid postnatal growth, losses due to phlebotomy, or delayed enteral feeding during hospitalization.[5] Breastfed preterm infants should be supplemented with 2 mg per kg of iron at discharge and subsequently screened for anemia at 4 and 12 months of age.[8] Comparatively, preterm infants on enriched or standard formula receive an adequate amount of iron through their diet, thereby negating the need for supplementation.[8] Though the primary treatment of anemia in preterm infants is red blood cell (RBC) transfusions, frequent transfusions may be associated with bronchopulmonary dysplasia among other complications.[9] Optimal protein supplementation may reduce the incidence of anemia in preterm infants thus reducing the need for such transfusions.[10]

For premature infants with very low birth weight, early breastfeeding initiation has been shown to reduce mortality.[11] Additionally, the ingestion of breastmilk reduces both the length of time required for full enteral feeding in the hospital and also

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TABLE 1: [31,34,38,39]

Dosages, Goals, and Toxicities of Fat-soluble Vitamin Supplementation for CF Patients

VITAMIN	DAILY DOSE	GOAL	TOXICITY
Vitamin A	1500 IU (Start low)	Normal range of healthy same age individuals	Liver cirrhosis, decreased bone mineral density, increased fracture risk
Vitamin D	400 IU	25(OH)D >20 ng/mL (50 nmol/L)	Vomiting, appetite loss, arrhythmia, confusion
Vitamin E	α-tocopherol: 50 IU	α-tocopherol/cholesterol > 5.4 mg/g	No known adverse effects
Vitamin K	0.3-1 mg	Routine measurement not widely available	No known adverse effects

Abbreviation: 25(OH)D = 25-hydroxyvitamin D

the incidences of retinopathy or sepsis.[11,12] Further, the limited exposure to the maternal microbiota and the use of antibiotics in premature infants that is given to reduce the risk of sepsis, results in the underdevelopment of the gut flora, which can lead to greater infection susceptibility.[13,14] Therefore, probiotics should be implemented to alleviate these effects in the infant and the risk of late onset sepsis.[15]

GASTROESOPHAGEAL REFLUX

Gastroesophageal reflux (GER), common in infants, is due to transient lower esophageal sphincter relaxation.[16] Gastroesophageal reflux disease (GERD) is a severe state of reflux accompanied by troublesome symptoms that may include dysphagia, heartburn, recurrent vomiting, chest or epigastric pain, asthma, wheezing, apnea or cyanosis.[16,17] GERD may also lead to reflux esophagitis, strictures, respiratory complications, failure to thrive, Barrett's esophagus, or esophageal adenocarcinoma.[17] While most reflux cases in the newborn typically resolve during the first year, lifestyle modifications including dietary changes can help decrease the frequency and severity of reflux episodes and such modifications are the recommended first-line of therapy for relieving GERD symptoms.[18]

In order to rule out other disorders aside from GERD, such as a milk allergy, it is recommended that breastfeeding mothers remove cow's milk and eggs from their diet for a 2 to 4 week period.[19] For formula-fed infants with GERD, parents should use a formula consisting of hydrolyzed protein or an amino acid based formula due to beneficial effects on gastrointestinal motility and esophageal acid exposure.[20] Feeding volume should be decreased while frequency of feeding should be increased.[19] Though thickening agents and anti-regurgitant formulas may decrease observable regurgitation, neither has been associated with a decrease in the actual number of reflux episodes and thickening agents containing rice or corn may also contribute to unintended weight gain.[17,19] Moreover, thickening agents have been associated with necrotizing enterocolitis in preterm infants.[21] Overall, the incidence of GERD is lower in breastfed infants versus formula-fed infants.[22]

CYSTIC FIBROSIS

Cystic fibrosis (CF) is an autosomal recessive disorder that leads to impaired chloride transport across cell membranes producing abnormally thick secretions in the lungs, pancreas, gastrointestinal tracts, and hepatobiliary tracts.[23] Common complications include CF-related diabetes, asthma, osteopenia, GERD, and liver disease. Because malnutrition is a serious concern for CF patients, nutrition therapy has become part of the standard of care, in efforts to improve height and weight percentiles.[24] Furthermore, newborn screening has resulted in earlier diagnoses, allowing more effective nutritional intervention.[25,26]

Optimal nutrition is associated with better lung function, fewer CF-related complications, and consequently a longer life span.[27] Achieving optimal nutrition involves adequate energy intake, and regular dietary and growth monitoring.[28,29] Poor nutrition in CF is often a result of the negative energy balance due to increased energy requirements, poor dietary intake, fat malabsorption, and glycosuria.[30] Nutritional goals are assessed via weight and height for age percentiles in infants up until two years of age.

It is recommended that CF infants are breastfed exclusively, at least for the first year of life, as it applies to healthy infants. If unable, regular infant formula can be used, along with nutrition counseling on effective feeding strategies. Standard infant formula may be cow milk-based, which is the most common type, or soy protein-based.[32,33] Hydrolyzed formula is often given to infants with malabsorption issues not related to CF. Solid foods can be introduced at 4-6 months of age.

Because salt loss occurs with CF and can lead to poor growth, breastfed infants should be given 1-2 mmol per kg/day of table salt (NaCl), in small amounts throughout the day, preferably diluted in water or fruit juice. Under special circumstances, such as hot weather or increased fluid loss, up to 4 mmol per kg/day of table salt can be given. The need for supplementation should be evaluated on an individual basis.[23,31]

Daily doses of fat-soluble vitamins (A, D, E, and K) are recommended for infants with suboptimal serum levels, especially

TABLE 2: [31,40]

Dietary Calcium Reference Values for CF Infants

AGE	DIETARY REFERENCES VALUES
0-6 months	200 mg/day
7-11 months	280 mg/day

those suffering from poor fat absorption mediated by pancreatic insufficiency. While symptomatic vitamin A deficiency is rare, low levels are associated with poor clinical status and compromised lung function. Vitamin D and calcium help maintain bone mineral density. Vitamin E deficiency can lead to hemolytic anemia and decreased cognitive function. During pulmonary exacerbations of CF, vitamin E requirements increase with oxidative stress. Vitamin K deficiency can cause poor bone health, and intracranial hemorrhages in infants. While vitamin K is not routinely measured due to cost, levels are generally low in CF infants, prompting empiric supplementation for all infants.[31,34,35] *Table 1 (See page 21)* highlights doses, goals, and toxicities of the fat-soluble vitamins. Regarding calcium levels, the goal is to maintain the same levels as in healthy, same-aged individuals, although it remains unclear as to when calcium supplementation should be initiated.[31,36] *Table 2* shows dietary reference values, starting at 0 months of age, which are derived from the amount of calcium absorbed by healthy breastfed infants. However, other literature recommends that screening for calcium deficiency begin after age 8 if risk factors such as chronic steroid use, low-impact activity, delayed pubertal development, or poor nutrition exist.[29,37] As the infant grows older, recommendations will change according to age range. Generally, for children and adolescents, a high-calorie, fat-unrestricted diet is recommended, in conjunction with antibiotics, pulmonary treatments, and/or pancreatic enzyme replacement therapy (PERT) as needed.[36]

DOWN SYNDROME

As of 2010, Down Syndrome (DS), or trisomy 21, continues to be the most common chromosomal disorder in the United States, with 1 out of 733 infants born with this disorder. DS infants often initially present with a lower birth weight and a reduced metabolic rate eventually becoming progressively overweight and prone to obesity.[41] Additionally, constipation and GER are common complications due to hypotonia and low activity level. Like all other infants, breastmilk is the gold standard for DS infants due to easier digestion and immune supplementation from antibodies since DS infants are more prone to infection. However, unique breastfeeding challenges exist, including excessive sleepiness and hypotonia of facial and lip muscles leading to difficulty in swallowing and sucking.[42,43] Such obstacles may lead to earlier weaning and less frequent feedings, predisposing the DS infant to infections and lower nutritional intake. Furthermore, excessive sleepiness may prevent the infant from receiving hind milk, which comes towards the end of the feeding and is known to have higher caloric and fat content.[42] Physician guidance, along with community resources and outpatient lactation services, should help promote optimal breastfeeding.[43,44]

INBORN ERRORS OF METABOLISM

Out of the 4 to 5 million newborns born each year, newborn screening programs will detect an inborn error of metabolism in 1 out of 800 newborns.[45] It is important to treat these conditions early, as they can lead to moderate to severe neuropsychological dysfunctions, developmental disabilities, and death.[46] A blood sample obtained at 24-48 hours of life is screened for more than 60 conditions and provides results within 24 hours.[46] These conditions include amino acid disorders such as phenylketonuria (PKU) and maple syrup urine disease (MSUD), and multisystem diseases such as cystic fibrosis and galactosemia, a disorder which can lead to failure to thrive, infection, cataracts, liver failure, and death.[46] A majority of these conditions are treated by nutritional management. Metabolic conditions, such as amino acid and fatty acid oxidation disorders, are treated with a protein-restricted diet using specific infant formulas and the avoidance of fasting.[46] Nutritional guidance is critical in these patients as it can mitigate the negative consequences of these disorders, which are often characterized by deficiencies or excesses of amino acids or enzymes that are needed to metabolize nutrients.

PHENYLKETONURIA

Phenylketonuria (PKU), occurring in 1 in 15,000 newborns, is a disorder in which phenylalanine, an essential amino acid found in most dietary intact protein sources, cannot be catabolized into tyrosine and thus creates an excess of phenylalanine in the body.[45] High phenylalanine levels are neurotoxic, and prevent the production of protein and the neurotransmitters dopamine and serotonin, leading to intellectual disabilities, abnormal motor, behavioral, and negative neurocognitive effects, resulting in poor schoolwork and work performance.[47] With treatment, mental retardation can be prevented. Standard treatment of PKU consists of a dietary restriction of phenylalanine and medically-prescribed phenylalanine-free or restricted amino acid-rich medical foods.[48] Medical foods are defined as "products that provide protein and varying amounts of carbohydrate, fat, vitamins, and minerals."[49] In the case of an infant with PKU, a medical food would be a powdered formula that contains all the nutrients required for growth and development, excluding the offending nutrient, phenylalanine.[49] Medical foods are critical for treating individuals with PKU because the extra nutrients included in these foods provide about 85-90% of all the protein that a newborn needs.[49] Supplementation with tyrosine is also an important part of the diet. Although all the medical foods provide tyrosine, if blood concentrations remain persistently low, extra supplemental tyrosine must be included in the diet.[50]

The goal of dietary treatment is to maintain phenylalanine levels of 120-360 µmol/L throughout life.[51] When recommending a medical food plan for a patient, an individualized approach should be used, taking into account the patient's current blood phenylalanine levels, age, growth, and protein needs. The prescribed diet should be frequently monitored to ensure that

there is sufficient phenylalanine, protein, and calories required for growth during childhood, and modified, as needed, if the patient's energy needs are not being met.[52] When a patient is not adhering to a prescribed medical food regimen, an assessment for any vitamin or mineral supplementation should be provided in order to maintain metabolic control and nutritional adequacy.[50] New and alternative protein sources such as glycomacropeptides, elaborated in *Table 3*, may be a replacement option for the medical foods, especially when adherence is difficult.[47]

MAPLE SYRUP URINE DISEASE

Maple syrup urine disease (MSUD), occurring in 1 out of 185,000 newborns, is caused by a deficiency in branched-chain α-ketoacid dehydrogenase (BCKD), leading to the accumulation of the branched chain amino acids (BCAA): leucine, isoleucine, and valine and their corresponding α-ketoacids.[45,53] Exogenous, or dietary, BCAA are major precursors for protein synthesis and a major energy source when there is enough BCAA from endogenous breakdown of muscle.[53] Excess amounts of BCAA in classic MSUD, which is less than 3% residual enzyme activity, causes cerumen and urine that may smell of maple syrup, which presents as early as 12-24 hours and 48-72 hours after birth, respectively.[53] Aside from the maple syrup urine, newborns may appear normal, although symptoms such as vomiting, lethargy, poor suckling, and irritability may develop within the first week of life.[54] MSUD may also cause convulsions and coma, if left untreated.[45]

Treatment of MSUD includes rapidly reducing and restricting dietary BCAA, while maintaining sufficient amounts for anabolism and turnover. It is also important to initiate treatment within 7-10 days after birth before irreversible neurologic damage can occur.[54] Dietary recommendations are noted in *Table 3*.[53] Nutritional status must be monitored to ensure normal growth, development, and health maintenance.[53]

GALACTOSEMIA

Galactosemia, occurring in 1 out of 100,000 newborns, is an autosomal recessive disorder in which there is a profound defect

TABLE 3: [47,53,56]

Allowed and Restricted Diets for PKU, MSUD, and Galactosemia.

DISORDER	ALLOWED DIET	RESTRICTED DIET
PKU	Phenylalanine-free or restricted amino acid-rich medical food (powdered formula) Calculated amounts of breastmilk or standard infant formula Foods modified to be low in protein Glycomacropeptide, a protein derived from cheese whey that is rich in specific essential amino acids but is naturally free of tyrosine, tryptophan, and phenylalanine	Dietary Phenylalanine High protein/calorie (non-modified) foods
MSUD	**BCAA-free medical food** Intact protein (breastmilk or infant formula with known leucine content)	Dietary BCAA
Galactosemia	Soy-based infant formulas containing soy protein isolate, amino acid-based elemental infant formulas All fruits, vegetables and their juices, pickled fruits and vegetables All legumes (e.g. navy beans, kidney beans, garbanzo beans, soybeans) Sodium and calcium caseinate, a precipitated form of casein, which is a protein in cow's milk. Caseinates are extensively washed and do not contain whey	-Breastmilk, all milk-based infant formulas All milk-based foods and beverages except for caseinates and aged cheeses All milk-based ingredients including buttermilk solids, casein, dry milk protein, dry milk solids, hydrolyzed whey protein, hydrolyzed casein protein, lactose, lactalbumin, whey Organ meats, meat-by-products Soy products that are fermented Fermented soy sauce

in the enzyme galactose-1-phosphate uridylyltransferase.[55] Early diagnosis, followed by immediate dietary restriction of galactose, can prevent or reverse sequelae of classic galactosemia which, without intervention, could potentially be fatal.[55] Treatment consists of restricting galactose and dairy intake by switching infants to either an alternative formula that is soy-based or a prescribed elemental formula which in some cases has even lower levels of galactose.[55] Dietary recommendations for galactosemia are noted in *Table 3 (See page 23).*[56] All forms of soy formula are acceptable, but premature infants with galactosemia will need elemental infant formulas instead.[56]

Treating galactosemia through a strict diet is crucial and necessary, but this alone is not enough to eliminate the long-term effects of the disorder. Most patients still report complications including cognitive disabilities, speech problems, and neurological and/or movement disorders.[55] More research on statistically powerful comparative studies is needed to understand the benefits and harms of differing approaches.[55] Some studies suggest the need for evidence-based best practice guidelines regarding optimal strictness and duration of dietary galactose restriction.[57]

CONCLUSION

Different strategies are needed to manage the unique nutritional needs of infants suffering from prematurity, GER, CF, Down syndrome, and IEM disorders. Since infants develop quickly and are especially vulnerable, providing immediate optimal nutritional care, along with medical therapy when needed, will improve the chances of survival and reduce the likelihood of negative outcomes including FTT and further neurological or immunological sequelae. With the exception of infants suffering from galactosemia, breastmilk has been shown to be beneficial for those infants diagnosed with the conditions discussed. Furthermore, premature infants should be given probiotics, and CF infants should have salt and fat-soluble vitamin supplementation, as needed. Infants with GERD and DS necessitate optimal breastmilk or formula feeding strategies. Lastly, management of PKU, MUSD, and galactosemia involve carefully monitoring a restricted diet of phenylalanine, BCAA, and galactose, respectively. It is important to employ an individualized approach, based on an infant's laboratory values, age, and weight and height percentiles. For specific conditions such as CF and IEM disorders, multi-disciplinary specialty teams exist to treat and support the infants and their families. However, within the primary care setting, the practitioner should have a basic understanding of nutritional management, so as to be prepared when the appropriate situation arises. While certain recommendations have been well established for many years, new research and studies will continue to improve our understanding about the nutritional needs of newborns, including those with special disorders.

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REVIEW ARTICLE

Abnormal Uterine Bleeding: An Age Based Approach

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Abnormal uterine bleeding (AUB) is a concern across the female reproductive lifespan. The initial evaluation focuses on identifying the underlying cause, either related or unrelated to structural abnormalities. Treatment options are then matched to the individual needs of the patient, which vary based upon age and reproductive plans. This article addresses common examples of age-specific issues associated with AUB. A case-based approach will discuss the evaluation and management of AUB issues including anovulation, polycystic ovarian syndrome, endometrial hyperplasia, and postmenopausal bleeding on hormone replacement therapy.

INTRODUCTION

Abnormal Uterine Bleeding (AUB) is the preferred terminology for heavy menstrual bleeding or intermenstrual bleeding.[1] As defined by the Menstrual Disorders Working Group of the International Federation of Gynecology and Obstetrics (FIGO) and endorsed by the American College of Obstetricians and Gynecologists (ACOG), AUB is acute or chronic "bleeding from the uterine corpus that is abnormal in regularity, volume, frequency, or duration and occurs in the absence of pregnancy." Using the acronym PALM-COEIN, both groups support the division of AUB into a classification system based on etiologies "related to uterine structural abnormalities" and "unrelated to uterine structural abnormalities": P- Polyp, A- Adenomyosis, L- Leiomyoma, M- Malignancy and hyperplasia, C- Coagulopathy, O- Ovulatory dysfunction, E-Endometrial, I- Iatrogenic, and N- Not otherwise classified. This system should be used to guide a thorough medical history and physical exam for each patient.[1,2]

In the last 20 years, endometrial cancer incidence has increased by 40%.[3] Endometrial cancer risk factors for women under age 40 include nulliparity, hypertension, body mass index (BMI) greater than 30, irregular menstruation, and family history.[2] Endometrial cancer should be considered in any postmenopausal woman with AUB, particularly since the risk of endometrial cancer increases with age. Postmenopausal women who are not on hormone replacement therapy that experience AUB have a 10% risk of endometrial cancer.[4] Endometrial cancer risk factors can be divided into non-modifiable and modifiable *(Table 1)*.[5]

TABLE 1:

Endometrial Cancer Risk Factors

NON-MODIFIABLE	MODIFIABLE
Increasing age	Obesity
Caucasian race	Hormone Replacement
Early menarche	
Late menopause	
Nulliparity	
Infertility	

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The medical history is very important when considering AUB. It should include age of menarche, bleeding patterns, and severity of bleeding. The terms menorrhagia (menstrual blood loss > 80mL) and metrorrhagia (intermenstrual bleeding) have been replaced with heavy menstrual bleeding (AUB/HMB) and intermenstrual bleeding (AUB/IMB), respectively. Medical history should also include surgeries, medications, and symptoms of hemostatic disorders. The physical exam should include general physical and pelvic examination - external, speculum with pap or human papilloma virus (HPV) test based on age specific screening guidelines,[6] and bimanual exam. Laboratory testing includes a pregnancy test, complete blood count, targeted screening for bleeding disorders (if risk factors present), and thyroid function tests. In addition, testing for Chlamydia trachomatis should be considered. Recommendations for diagnostic imaging and endometrial tissue sampling are based on age and risk factors and will be discussed in separate sections.[7]

This review will use case examples to focus on three age groups of women with AUB: ages 18-35, 35-50, and over 50. Consideration of the medical history, physical exam, and management of common bleeding conditions will be highlighted. Where appropriate, associated co-morbid conditions and the risks of endometrial cancer will be discussed.

CASE 1: YOUNG ADULT – AGE 18-35

A 22-year-old female presents with abnormal menses. For the past 3 years, she has had 2-3 periods per year and the last one was 6 months ago. Each bleeding episode is heavy with cramping for about 7 days. She does not smoke or take any medications, and denies pregnancy or history of sexually transmitted diseases. First menses reported at age 13 with normal childhood and sexual development. Sexual history includes one lifetime partner and she is currently single. Family history is negative. Physical exam pertinent findings include normal vitals except for BMI of 35 and waist circumference of 36 inches. She has moderate to severe facial acne and sparse coarse hairs on her chin. Pelvic exam shows no clitoromegaly, uterus and ovaries are not palpable. Laboratory studies performed include negative urine pregnancy, normal prolactin, TSH, FSH, LH, high-density lipoprotein (HDL) 40 mg/dL, triglycerides (TG) 180 mg/dL, and elevated fasting blood sugar (FBS) 108 mg/dL. A free testosterone was 38 pg/mL (normal range, 1-21 pg/mL). Pelvic ultrasound was performed showing endometrial stripe 4 mm and normal ovaries.

The causes of AUB in adolescents and young adults overlap in pathology. Adolescent (ages 13-18) AUB is commonly caused by anovulation and an immature hypothalamic-pituitary-ovarian axis.[7] Unrelated to the age at first menses, 60- 80% of cycles become regular (21-34 days apart) within three years after the start of menarche. Most patterns of irregular bleeding in adolescence are considered physiologic and benign. Adolescent obesity has also been reported to play an increasing role in anovulatory cycles.[2]

Up to 20% of patients with heavy bleeding that occur within the first few menstrual cycles may have an associated coagulation disorder. Reported risk factors include bleeding during dental work, surgery-related bleeding, frequent bruising, epistaxis, or bleeding gums with tooth brushing, and family history of bleeding. Laboratory testing for coagulation issues include partial thromboplastin time, prothrombin time, activated partial thromboplastin time, fibrinogen, von Willebrand factor antigen, ristocetin cofactor assay, factor VIII, serum iron, total iron binding capacity, ferritin, and liver function testing. For any abnormal coagulation factor test, a hematology consultation should be considered.[8]

In young adults (19-39 years) the most common causes of all AUB include pregnancy, structural lesions, anovulatory cycles, hormonal contraception, and hyperplasia.[7] Our patient had a negative pregnancy test, ultrasound, and medication history. In reproductive age women, polycystic ovarian syndrome (PCOS) is the most common cause of anovulatory ovarian dysfunction (AUB-O). Menstrual cycles are determined anovulatory (AUB-O) if they are greater than 35 days from the previous one.[9] Our patient also had last menses 6 months ago, which is considered anovulatory amenorrhea and brings into consideration polycystic ovarian syndrome.

The diagnosis of PCOS has been debated by specialty societies and criteria agreement includes the presence of 2 out of the 3 categories: hyperandrogenism, chronic anovulation (oligo- or amenorrhea), and polycystic ovaries (one or both ovaries on ultrasound with 12 or more follicles measuring 2-9 mm in diameter or increased ovarian volume greater than 10cm3).[9] The Androgen Excess Society requires the presence of hyperandrogenism, either physical or chemical signs, whereas the Rotterdam criteria requires any 2 of the 3 criteria. In our case, she has 2 of 3 criteria with amenorrhea and hyperandrogenism (acne, hirsuitism, elevated testosterone). A pelvic ultrasound is not indicated to make the diagnosis of PCOS.[10]

Our patient also has metabolic syndrome, 3 out of 5 criteria needed: increased waist circumference greater than 35 inches, FBS greater than or equal to 100 mg/dL, HDL cholesterol less than or equal to 50 mg/dL, TG levels greater than or equal to 150 mg/dL, and blood pressure greater than 130/85.[11] ACOG recommends a two-hour oral glucose tolerance test for diagnosis of insulin resistance in patients with PCOS.[10]

Insulin resistance is directly linked to the pathology of PCOS. The mechanisms proposed include direct stimulation of ovarian steroidogenesis, reduction in sex hormone-binding globulin, and disruption of the hypothalamic-pituitary axis which lead to hyperandrogenism and ovarian dysfunction.[12] Insulin resistance further exacerbates weight gain that perpetuates the anovulatory cycle of PCOS.

Other causes of hyperandrogenism were ruled out in this case. Our patient had a normal FSH, LH, TSH, and prolactin that rule out primary ovarian failure, thyroid disease, and prolactin disorders. Free testosterone is recommended over total testosterone in the diagnosis of androgen excess, but physical exam findings are considered equally diagnostic. A 17-hydroxyprogesterone level should be done to rule out congenital adrenal hyperplasia. Unless rapid virilization is present, DHEA is not recommended. Cushing syndrome is extremely rare and screening is not recommended unless other criteria are present.[9]

were regular and lasted around 27 days. She also reports heavier menstrual bleeding, with a length of 7 to 9 days. She reports no other complaints, such as hot flashes or sleep disturbances. She has a history of hypothyroidism, treated with levothyroxine 88 mcg once daily. She is a non-smoker, and is currently sexually active with one partner for 6 months and uses condoms for contraception. She previously used combined oral contraceptives from age 19 to 34 without adverse effects. Her physical exam reveals a BMI of 27 kg/m2 and blood pressure of 118/70 mmHg. Her pelvic exam is normal and her TSH and CBC are within normal limits. A urine pregnancy test is negative. An endometrial biopsy is negative and transvaginal ultrasound shows no structural abnormalities.

Nearly all women experience changes in menstrual bleeding patterns for 4 to 8 years preceding menopause due to declining ovarian function.[16] Although common, complaints of abnormal uterine bleeding during this time must be fully evaluated to rule out other potential causes. The hormone imbalance between estrogen and progesterone that occurs during this time increases risk for endometrial hyperplasia or cancer. Uterine leiomyomas, adenomyosis, thyroid disorders, and coagulopathies are additional examples of pathology associated with abnormal bleeding.[7] Transvaginal ultrasound, hysteroscopy, and saline infusion hysterography can facilitate the detection of anatomic pathology. Endometrial sampling is a key procedure in women with AUB who are 45 years or older. It is also indicated for women who are younger than 45 years if they have a history of unopposed estrogen exposure such as in PCOS, family history of hereditary nonpolyposis colorectal cancer or endometrial cancer or have persistent AUB that fails medical management.[7] In addition to these studies, it is important to assess for iron deficiency anemia and to rule out pregnancy prior to considering treatment options.

The endometrial biopsy for our patient is negative and her normal CBC indicates no need for iron replacement. As anatomic causes are ruled out, the management of AUB-O during perimenopause should focus on a woman's individual concerns related to quality of life. While medical and surgical options exist, either hormonal or non-hormonal pharmacologic strategies are typically considered first-line.

Hormonal options:

Hormonal contraceptives are a viable option for perimenopausal women who are sexually active. Combined hormonal contraceptives (CHCs), containing estrogen and progestin, regulate the menstrual cycle and reduce both the length and volume of menstrual bleeding. If acute management of bleeding is needed, a monophasic oral product containing 35 mcg of ethinyl estradiol may be administered three times daily for 7 days.[8] For non-acute bleeding, the use of a low-dose monophasic preparation is preferred and products that either shorten the hormone-free interval to 4 days instead of 7, or those that offer 3 months of extended use or 12 months of continuous use, provide additional choices that limit the bleeding phase.[17] The combined vaginal ring and contraceptive patch are advantageous for those wishing to avoid daily use, and can be used in a cyclical (monthly withdrawal bleed) or continuous pattern.[17]

The estrogen component of CHCs provides additional benefit for women experiencing vasomotor symptoms, another common symptom during the menopausal transition. However, estrogen-associated precautions and contraindications such as tobacco use, uncontrolled hypertension, history of stroke or venous thromboembolism (VTE), migraine, estrogen dependent cancer, and gallbladder disease may be more common in this age group than younger women, and may prevent the use of an estrogen-containing product.[18] The contraceptive patch has additional warnings regarding thromboembolic risk, and should be avoided in women with VTE risk factors.[19]

Progestin-only contraceptives are often selected for women who are not candidates for estrogen. Unlike combined estrogen-progestin products that provide a regular withdrawal bleed, many women experience amenorrhea after months of progestin-only product use. Unfortunately, unpredictable spotting is common as they are initiated, with a gradual reduction in bleeding episodes over time.[20] There are four levonorgestrel IUDs available in the US providing between 3 to 5 years of contraception depending on the product. The 52 mg LNG-IUS (Mirena) has an FDA-approved indication for menorrhagia, and has been shown to reduce menstrual blood loss, with high acceptability.[20, 21] The etonogestrel subdermal implant provides contraception for up to 3 years and is associated with variable menstrual bleeding patterns, with more than half of women either experiencing infrequent bleeding or amenorrhea.[20] The depo medroxyprogesterone acetate injection, administered every 3 months, produces amenorrhea in the majority of women after 1 year of use. It also has been shown to improve hot flashes associated with perimenopause. However, its use is associated with decreased bone density, which is concerning as a woman approaches menopause.[17, 19]

Women not desiring contraception can be treated with cyclical progesterone regimens, which result in a withdrawal bleed after the completion of each cycle. If managing an acute bleeding event, oral medroxyprogesterone may be given as 20 mg three times daily for 7 days.[8] For chronic management, oral medroxyprogesterone acetate 10 mg daily is given for 10-14 days per month. An additional non-contraceptive hormonal option is a GnRH agonist, which down regulates the hypothalamic, pituitary, ovarian axis and leads to a "pseudomenopause." These are generally not recommended as a first-line approach due to the lack of data in AUB-O and the risk for hot flashes and reduced bone density.[22]

Non-hormonal options:

Women with contraindications to hormone products may be candidates for non-hormonal options. Nonsteroidal anti-inflammatory drugs (NSAIDs) such as mefenamic acid, naproxen, and ibuprofen are effective for the management of AUB through uterine vasoconstriction resulting from decreased prostaglandin synthesis.[23] Because of the unique mechanism, NSAIDs can be used in conjunction with other medical options, such as hormonal contraceptives. Women with an aspirin/NSAID allergy, bleeding disorders or who are taking other anticoagulant or antiplatelet medications should avoid this option.

TABLE 2:

Management of Hirsutism

HIRSUTISM MANAGEMENT	PROS	CONS	SIDE EFFECTS
Laser Therapy	Well tolerated	Cost Short term effect Dark hair better results	None – but adding eflornithine to laser had better effects
Eflornithine HCL Facial Cream	Well tolerated Combined with laser therapy improves effect	Cost Short term effect, use recommended for 6 months	Local stinging, burning, redness, rash
Spironolactone-aldosterone antagonist	BID dosing Cost Improves acne	Do not use in pregnancy	Hyperkalemia Orthostatic hypotension
Flutamide-androgen receptor agonist	Combined with lifestyle/ metformin- additive effects[13]	Do not use in pregnancy	Dry skin Hepatitis (rare)
Finasteride - 5-alpha reductase inhibitor	Better tolerated than other anti-androgens Better if combined with OCPs	Do not use in pregnancy	Rare
Combined Hormonal Contraception	Cost Improves acne	Do not use in pregnancy	May increase insulin resistance
Metformin	Cost	Results vary Not first line for hirsutism or acne[12]	GI upset, diarrhea

Hyperandrogenism also causes hirsutism, acne, and alopecia. Hirsutism involves substantial growth of terminal hairs over the chin, neck, lower face, and sideburns. This hair growth typically has gradual onset and worsens with weight gain.[9] Any patient with a rapid onset of hirsutism and clitoromegaly should be evaluated for an androgen secreting tumor.[10] Management of hirsutism is discussed in *Table 2.*[9, 10]

The further management of PCOS is multifocal. Both exercise and weight loss have proven cardiovascular reduction in morbidity and mortality. As little as a 5% reduction in weight has been reported to restore ovarian function and fertility in PCOS. The addition of pharmacotherapy with metformin (Glucophage) will improve ovulation, increase weight loss, and decrease insulin and androgen levels. Metformin may also prevent the conversion of insulin resistance to Type 2 diabetes.[12] A common skin finding of insulin resistance and PCOS is acanthosis nigricans that is described as hyperpigmented, verrucous skin patches in the neck folds or axillae.

Patients with PCOS are at increased risk of endometrial hyperplasia and endometrial cancer. Our patient had a normal transvaginal ultrasound; however, endometrial thickness in premenopausal women is not helpful in the determination of endometrial hyperplasia.[7] Prevention of endometrial hyperplasia in PCOS is achieved with hormonal contraception, either combined hormonal contraception (CHC) or progestin-only derivatives. The levonorgestrel-releasing intrauterine system is also acceptable. There have been no studies suggesting that one hormonal contraceptive is superior to another. Progestin-only therapy may include side effects of irregular bleeding. Contraindications and tolerability of various hormonal contraceptives is further discussed in Case 2. According to the AACE, the optimal number of induced cycles per year have not been determined.[12]

A large Australian retrospective study by Hart and Doherty in 2015 determined that PCOS increases the risk of many conditions. These include obesity, endometrial cancer, mortality, adult-onset diabetes, hypertension, ischemic heart disease, asthma, and mood disorders.[14] Other studies have discussed an increased risk of sleep apnea.[15] In addition to screening our patient for these co-morbid conditions, follow up monitoring of weight loss, insulin resistance, and cholesterol is recommended.

CASE 2: ADULT – AGES 35-50

A 46-year-old woman presents to clinic with complaints of irregular menstrual bleeding. She states that over the past year, her menstrual cycles are ranging from 20 to 36 days. Before that time, her cycles

Tranexamic acid is a fibrinolytic that reduces the volume of uterine bleeding, and is an option to manage acute bleeding in an oral dose of 1300 mg three times daily for 5 days.[8] It can be used to manage chronic bleeding, although it does not address the underlying cause. Caution is advised due to its associated risk for VTE, which is exacerbated by concomitant use of estrogen-containing contraceptives.

Surgical options of endometrial ablation and hysterectomy are typically reserved for use after pharmacologic strategies fail or in women who are not candidates for medical management.[24]

Our patient is sexually active and does not appear to have contraindications to estrogen or progesterone containing contraceptive products. She is not experiencing hot flashes, so a combined hormonal or progestin-only contraceptive may be used. The decision may be made based upon whether she would prefer a predictable withdrawal bleeding pattern, or a progestin-only method that would likely lead to amenorrhea after several months of use. She is not a candidate for an NSAID due to her aspirin allergy, so this should be avoided as an adjunctive measure.

CASE 3: OLDER ADULT, POST-MENOPAUSAL – AGE 50+

A 62-year-old, obese, nulligravida, female presents for a well-woman examination. She has never married and used condoms for contraception when she was sexually active. She has no significant past medical history and has not seen a doctor in the last 10 years. She believes that she has never had an abnormal pap smear. Her first menstrual period was at age 11 and she experienced menopause 6 years ago. She has never been on any hormone replacement therapy. She denies hot flashes or mood swings. The patient does mention however, an episode of vaginal spotting 2 weeks ago. The bleeding was managed by a pantiliner and lasted about 2 days. Her blood pressure and pulse are stable and BMI is 33kg/m^2. The results of a transvaginal ultrasound (TVUS) are indeterminate with poor visualization.

Any AUB in postmenopausal women should be further evaluated given the increased risk of endometrial cancer. Other non-malignant causes of postmenopausal bleeding include, but are not limited to: atrophic vaginitis, endometrial atrophy, fibroids, simple endometrial hyperplasia, and endometrial or cervical polyps.[25]

Our patient had an initial TVUS reflecting poor visualization. The next step in management includes an endometrial biopsy, hysteroscopy with dilation and curettage, or sonohysterography. The ACOG supports endometrial biopsy or transvaginal ultrasound (TVUS) for the initial evaluation of AUB in postmenopausal women.[26, 27] Either method is sufficient in most cases. The benefits of TVUS include less invasive, less expensive testing with a high negative predictive value. TVUS will allow visualization of structural polyps and fibroids. If the endometrial thickness on TVUS is less than 4 mm, the probability of endometrial cancer is 1%,28 and endometrial biopsy is not recommended. If the endometrial thickness is greater than 4 mm, endometrial biopsy, hysteroscopy with dilation and curettage, or sonohysterography is advised.[27,28]

Classification of endometrial tissue and risk categories include both hyperplasia with atypia and hyperplasia without atypia.[28] Hyperplasia with atypia has a greater risk for progression to carcinoma over 20 years, compared to hyperplasia without atypia.[29] If our patient's endometrial biopsy reflects hyperplasia with atypia or carcinoma, definitive treatment includes a total hysterectomy and staging of the disease. If diagnosed early, endometrial carcinoma is usually confined to the uterus in 75% of cases. Early detection affords lower mortality rates and favorable prognoses.[30] Non-surgical management may be considered in some patients who are younger and desire fertility or are not surgical candidates. If our patient's endometrial biopsy reflects hyperplasia without atypia, treatment with an oral progestin or LNG-IUD can be considered.[28] Newer drugs in research have included metformin.[29]

Current recommendations consider systemic hormone therapy (HT) appropriate for management of common menopausal symptoms, including vasomotor and urogenital symptoms.[31] Postmenopausal women with AUB who are currently using HT require unique consideration. It is well-established that unopposed systemic estrogen therapy in women with a uterus causes a substantial excess risk for endometrial cancer, which increases with time.[31, 32] Therefore, only women without a uterus should receive systemic estrogen alone for menopausal symptoms. All other women should receive a combination of estrogen and progestogen, which when given in a cyclic or continuous regimen, reduces the excess risk of endometrial cancer.[31] Current research points to greater endometrial cancer risk reduction with a continuous use pattern.[32] Daily continuous administration of estrogen plus progestogen is often associated with a variable and unpredictable bleeding pattern for several months, usually resulting in amenorrhea after that time. If the bleeding persists after 6 months, further endometrial evaluation is recommended. In contrast, the cyclic pattern (estrogen daily plus 12-14 days of progestogen per month) should result in a withdrawal bleed as the progestogen is stopped each cycle. Bleeding occurring outside this expected time should be evaluated.[31]

Women with a uterus who cannot tolerate a progestogen may be a candidate for estrogen plus bazedoxifene (a tissue-selective estrogen complex), which provides endometrial protection.[31] Women who experience bothersome bleeding patterns on HT can also consider nonhormonal options for vasomotor symptoms, such as clonidine, gabapentin or pregabalin, or serotonergic antidepressants.[33] Notably, women without other endometrial cancer risk factors receiving local vaginal estrogen therapy for genitourinary symptoms alone typically do not require additional progestogen for endometrial protection. However, safety has not been studied beyond one year. Any uterine bleeding experienced by a women receiving low dose, local vaginal estrogen should be investigated further.[31]

SUMMARY

Clinical evaluation of abnormal uterine bleeding requires careful consideration of age-specific factors. Identification of the underlying causes, whether structural or otherwise, allows the clinician to determine whether a surgical or medical approach is most appropriate. All decisions must be individualized to a patient's risk and reproductive plans.

AUTHOR DISCLOSURES:
No relevant financial affiliations

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BRIEF REPORT

Recurrent Psoas Syndrome Secondary to Urolithiasis and Indwelling Ureteral Stent

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KEYWORDS:

Osteopathic Manipulative Medicine

Pelvic Pain

Psoas Syndrome

Urolithiasis

Urology

Strong evidence-based guidelines exist for the evaluation and treatment of the acute medical consequences of urolithiasis, however, less emphasis has been placed on the assessment of acute and chronic musculoskeletal effects. In our case report, a 35-year-old male who develops a chronic psoas syndrome secondary to an episode of ureterolithiasis and ureteral stent placement is subsequently treated with long-term osteopathic manual medicine (OMM). Our case suggests that urolithiasis may be associated with the development of psoas syndrome – a condition that may be amenable to OMM. The specific treatment modalities discussed may be utilized to decrease symptomatology for patients presenting with similar findings.

INTRODUCTION

Urolithiasis affects approximately 1 in 11 people, with men being affected more frequently than women (10.6% versus 7.1%, respectively).[1] The most common cause of urinary calculi is dehydration. Stones also have a propensity to form when urinary levels of calcium, oxalate, cystine, and/or uric acid are elevated.[1] Patients with urolithiasis commonly present with exquisite flank pain, hematuria, difficulty urinating, groin pain, nausea, and vomiting. Differential diagnoses are vast and various organ, nervous, and muscular pathologies must be considered.

Symptomatology and physical exam findings help guide diagnosis, but the definitive diagnosis is obtained with imaging. Computed tomography (CT) without contrast is the best modality for identifying genitourinary (GU) stones, with ultrasound and X-ray also being helpful, yet inferior.[2] Stones may be managed with medical expulsive therapy (MET) or surgery. Many factors contribute to treatment choice including the patient's pain, vitals, and size of the stone. Psoas syndrome is a pain condition caused by injury to the psoas musculature that may have associated spasms and specific somatic dysfunctions (SD). The syndrome is likely underdiagnosed and should be considered as a differential for low back or flank pain radiating to the groin. Patients with psoas syndrome commonly complain of difficulty standing erect or lying prone, pain in the contralateral gluteal region, and radiation of pain down the opposite leg that stops above the knee. Common etiologies include prolonged flexion stress of the lumbar spine, rapid elongation of the psoas, and compensation for other SD's. In addition, psoas syndrome can present secondary to a variety of viscerosomatic reflexes like urolithiasis, appendicitis, prostatitis, and salpingitis. Osteopathic manipulation can be used to aid in the treatment of psoas syndrome.[3] We present the first reported case of a patient with chronic psoas syndrome secondary to urolithiasis and an indwelling ureteral stent, along with useful treatment options for practitioners.

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REPORT OF CASE

A 35-year-old Caucasian male presented to the emergency department with sudden onset left flank pain that radiated to his left groin. The pain began after voiding, 30 minutes prior to arrival, and was accompanied by nausea and vomiting. The patient had just finished mowing the lawn when the pain started. The pain remained constant, sharp, and severe. He denied any recent fevers, chills, hematuria, dysuria, penile discharge, testicular pain, or heavy lifting. Past medical history was only significant for an episode of epididymitis 15 years prior. Surgical history was unremarkable. Family history revealed cardiac disease, but no GU diagnoses. He was afebrile, tachycardic, and hypertensive. On physical exam the patient was in distress due to pain and had marked left flank pain on palpation. Labs revealed leukocytosis (13 x 109/L), a creatinine of 1.1mg/dL, and a normal serum uric acid. Urinalysis was deferred due to the patient's inability to void. An ultrasound of the kidneys and ureters displayed moderate left hydronephrosis, a dilated left proximal ureter, and a possible stone in the distal left ureter. These findings were confirmed with an intravenous pyelogram, which revealed a 2.2cm obstructing left ureteral calculus. Our patient had a left ureteral stent placed the following day, with definitive stone treatment seven days later. In the interim, he sought medical attention for a new type of pain that developed in

the left lower back with radiation to his left posterior belt line and left groin. The pain was described as episodic, severe, and cramp-like. Physical exam unveiled an inability to stand fully erect and tenderness to palpation deep within the left iliac fossa. L1-5 were side-bent left, with a segmental dysfunction at L1 of FRlSl. His left hip was significantly restricted to extension. He was diagnosed with an acute psoas syndrome which was successfully treated with combination therapy of OMM, anti-inflammatories, and muscle relaxants. Over the course of the next thirty years, he has presented with thirteen recurrent episodes of acute-on-chronic psoas syndrome; a frequency of approximately one episode every one and a half years. Almost every recurrent episode was professionally evaluated with appropriate laboratory and imaging tests to rule out urolithiasis or other possible differentials. Each of the thirteen episodes were diagnosed solely as acute-on-chronic psoas syndrome. Every episode has been amenable to serial OMM treatments and combination therapy of anti-inflammatories and muscle relaxants. Several of the OMM modalities utilized in our patient's care are discussed later in this article.

DISCUSSION

The psoas major muscle originates from the transverse processes of L1-L5, the lateral bodies of T12-L5, and the associated intervertebral discs. The muscle inserts distally on the lesser trochanter. Nervous supply to the psoas muscle is derived from the ventral rami of L1-L4. The ureter receives nervous supply from nearby autonomic plexuses, which utilize many of the same lumbar afferents and efferents as the psoas. Each ureter lies directly on the anterior surface of the respective psoas musculature.[4] Therefore, it is reasonable to theorize that inflammation generated within our patient's ureter resulted in subsequent irritation of the underlying psoas musculature leading to psoas syndrome. Although the etiology of most cases of acute or chronic psoas syndrome are multifactorial and organic in origin, it is likely that urolithiasis and stent irritation could lead to psoas syndrome as well. This report adds to the current literature as it is the first to make a direct link between the latter.

Many OMM techniques can be applied to the treatment of psoas syndrome. The modalities discussed here are the mainstays of our treatment approach and include a thoracoabdominal diaphragm release, psoas muscle energy *(Figure 1)* lumbar muscle energy *(Figure 2)*, and iliopsoas counterstrain.

The thoracoabdominal diaphragm has inferiorly-spanning tendinous arches that directly cover the superior aspects of the psoas musculature, as well as crural attachments to the upper lumbar vertebrae.[5] This intimate relationship often leads to dysfunction of the diaphragm secondary to psoas injury. We utilize a breathing-guided integrated neuromuscular release to improve diaphragmatic excursion. The technique is performed with the patient in the supine position; the clinician's hands wrap broadly around ribs 6-10 bilaterally. The indirect barriers of all diaphragmatic planes are engaged and held by the clinician while the patient maintains the phase of their respiratory cycle that is deemed the least resistant. This process may be repeated several times until restoration of diaphragmatic motion occurs.

FIGURE 1:

Prone positioning for muscle energy of the hypertonic psoas

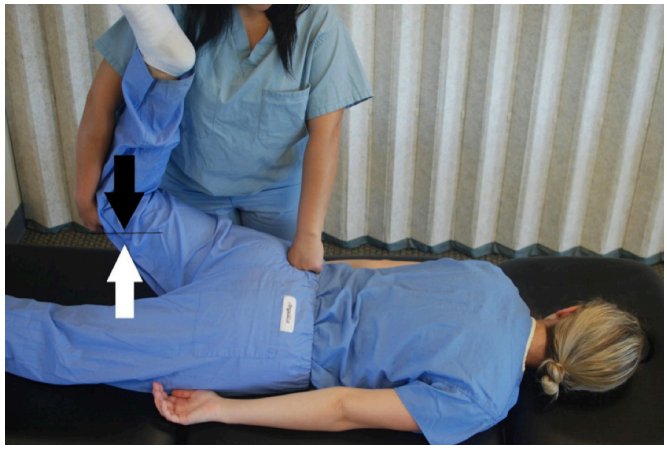

FIGURE 2:

Muscle energy for a side-bending dysfunction of the lumbar spine

FIGURE 3:

Pre- and post-treatment sagittal findings

Figure 1 (See page 37) displays the prone positioning for muscle energy of the hypertonic psoas. Approach this technique with care, as many patients in the acute phase may be unable to tolerate aggressive lengthening of their psoas musculature.

Figure 2 (See page 37) represents muscle energy for a side-bending dysfunction of the lumbar spine. The counterstrain point for the iliopsoas lies deep within the iliac fossa. Treatment of this point requires the patient to be positioned supine with both hips and knees passively flexed to 90°, ankles crossed, and thighs externally rotated. Maintaining correct positioning will shorten the psoas muscle fibers effectively resetting the facilitated segment, which may manifest as reduction in pain experienced by the patient.

Figure 3 (See page 37) displays the pre- and post-treatment sagittal findings from our patient. The post-treatment image on the right demonstrates lengthening of the psoas musculature with resultant improvement in erect posture.

CONCLUSION

Urolithiasis may result in inflammation of the ureter with subsequent irritation of the underlying psoas musculature, leading to psoas syndrome. In this case report, our patient demonstrates not only an acute episode, but also recurrent psoas syndrome episodes secondary to a ureteral calculus and an indwelling ureteral stent. When caring for patients with a history of urolithiasis and chronic pain, it is important for physicians to consider the diagnosis of psoas syndrome. OMM may be utilized to reduce patient symptomatology and improve somatic dysfunction related to psoas muscle spasm in both the acute and chronic settings.

AUTHOR DISCLOSURES:
No relevant financial affiliations

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Irregular and Postmenopausal Bleeding: When to Contact Your Doctor

Samantha Kiefer, DO; Tina Joyce, DO

Ronald Januchowski, DO, FACOFP, Editor | Paula Gregory, DO, FACOFP, Health Literacy Editor

Irregular menstrual bleeding (irregular periods) can come in many forms. It is defined as any type of bleeding that is abnormal when compared to the last few periods. It can include heavy bleeding, spotting, light periods, or periods that start early or come late. It also includes periods that are less than 21 days or greater than 35 days apart.

WHAT CAUSES IRREGULAR MENSTRUAL BLEEDING?

There are many causes of irregular bleeding. Non-threatening causes include polyps or overgrowth of tissue within the womb. Occasionally, cancers can cause irregular bleeding. Factors like stress, diet, birth control pills, thyroid imbalance, and pregnancy can have an effect on your period.

Call your doctor if you are suffering from any of the following:

- Heavy bleeding: soaking more than 1-2 pads or tampons per hour
- Bleeding that lasts for more than 7 days
- Periods that occur more frequently than every 21 days or less frequently than once every 35 days
- Are heavy and are associated with excessive bruising or a family history of bleeding disorders
- If you are dizzy or lightheaded after bleeding for some time

POSTMENOPAUSAL BLEEDING:

Menopause is the natural ending of periods that usually occurs for women between the ages of 45 and 55. The average age for women is 51. You are considered postmenopausal once you have not had any bleeding for 12 months in a row.

WHAT TO WATCH FOR:

Any vaginal/uterine bleeding that occurs after a woman has achieved menopause should be discussed with your doctor in order to rule out cancer as a potential cause.

MEDICAL CARE AND TREATMENT OPTIONS:

If you develop postmenopausal bleeding or irregular menstrual bleeding, please call your Osteopathic Family Physician. Most causes of irregular menstrual bleeding are not life threatening and can be resolved with medication, or they may resolve on their own. However, if you have heavy bleeding or bleeding after going through menopause, it is important to be evaluated right away. In case of any emergency, you should call your doctor or 911 right away.

SOURCE(S): *American College of Obstetricians and Gynecologists; the Centers for Disease Control and Prevention*

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Newborn Nutritional Guidance

Rachel Gougian, DO; Hannah Herman, DO
Ronald Januchowski, DO, FACOFP, Editor | Paula Gregory, DO, FACOFP, Health Literacy Editor

WHEN TO SEEK MEDICAL ATTENTION:

Remember that good nutrition is needed for proper growth. If your child is not gaining weight or is above 95% on the growth chart, discuss this with your Osteopathic Family Physician. In case of any emergency, you should call your doctor or 911 right away.

RECOMMENDATIONS FROM BIRTH TO 12 MONTHS:

The World Health Organization and the American Academy of Pediatrics recommend only breast-feeding for the first six months of life for optimal health and development. Feeding amounts can change in the first days of life; if breastfeeding, you should expect to feed 8-12 times every 24 hours, which averages to a feeding every 2-3 hours. The usual recommendation is 15-20 minutes on each breast each time that your baby feeds.

Many new mothers choose to formula feed, and whichever you choose, the best baby is a fed baby! If formula feeding, you should feed approximately 20 oz. per day after the first few days, which means feedings of 2-3 oz. every 2-3 hours. Formula intake should increase from 24 oz. per day at 1 month of age to 30-32 oz. per day by 4 months of age. All brands of formula provide adequate nutrition, so no brand is better than another.

Signs of hunger in a baby (which can be applied to formula fed babies as well) include tongue sucking, hands in mouth and rooting reflex. Look for these signs before feeding your baby and continue to check for fullness as you are feeding.

Begin nutritious solid foods between 4 and 6 months of age. Look for your baby's ability to control their neck and head movements as well as interest in starting foods. You may choose to start with a simple cereal, but a gradual introduction of a variety of foods, flavors, and textures is recommended. Try adding fruits and vegetables first, including applesauce, avocado, sweet potato, carrots, peas, beans, etc. By 8 to 10 months, you should aim to feed your baby mashed versions of the same foods you would feed yourself or older children, and coordinate a feeding schedule that corresponds with family mealtimes. Feed your baby only when hungry and stick to portions of 2-3 tablespoons. Never force-feed your baby. Remember that in the first year of life the majority of calories still comes from mom's milk or formula.

WHAT TO AVOID AND WHAT TO SUPPLEMENT:

Many medications (including drugs and alcohol) can be passed in breast milk. If you choose to drink alcohol, you should limit what you drink and breastfeed at least two hours after the last drink.

If you take medications, the online resource LactMed will provide information about safety of use in breastfeeding moms. *LactMed: toxnet.nlm.nih.gov/newtoxnet/lactmed.htm*

Breast milk provides enough calories, protein, fat, and every essential vitamin except Vitamin D. If you are exclusively breastfeeding, your physician will prescribe a Vitamin D supplement to give your newborn. Avoid cow's milk until 12 months of age, because it does not contain the recommended nutrition for proper growth and development. Avoid honey for the first year of life, due to an increased risk of botulism.

SOURCE(S): *American Academy of Pediatrics(AAP): healthychildren.org, LactMed, World Health Organization(WHO).*

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