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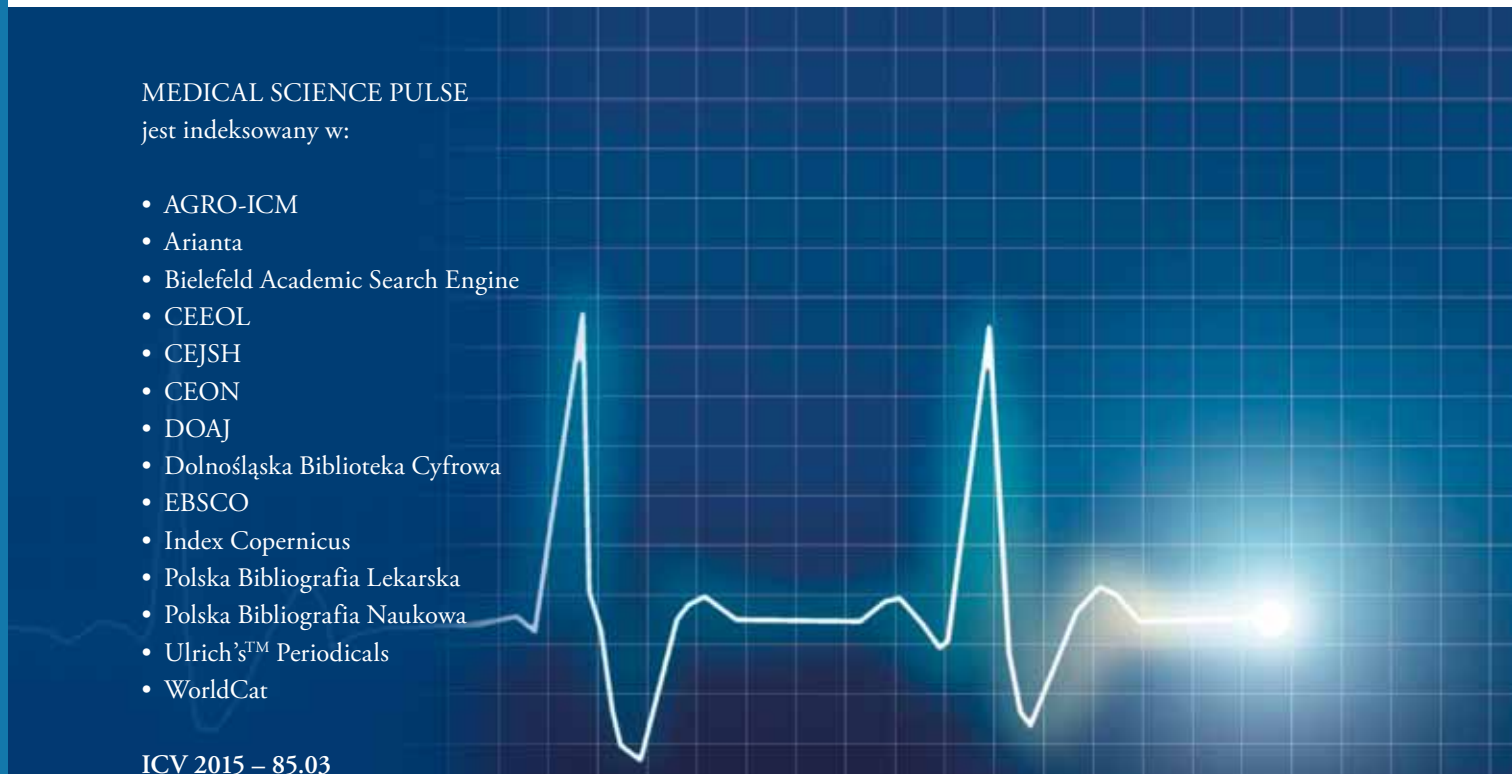

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Ladies and Gentlemen, Faculty, Graduates and Students of Universities, Readers and Enthusiasts of *Medical Science Pulse*!

It is with true satisfaction that we can inform you that after five years of publication of the *Higher School's Pulse* Academic Quarterly, due to the growing internationalisation and dynamic development of the periodical, which has increasingly met the professional criteria of medical experts, the editorial team has made the decision to change the title from *Higher School's Pulse* to *Medical Science Pulse*. We hope that this change will allow for greater individualisation and better identification on the academic periodical market, as well as a specialisation of the title in the presented research area. The new layout of the Quarterly will emphasise the new quality of the operations which started in 2017.

The first volume accompanies the 4th International Conference of the Medical Science Pulse: Young Scientists – from Master of Science to Associate Professor, under the patronage of His Magnificence the Rector of the Public Higher Medical Professional School in Opole, which is a continuation of the "Puls Uczelni" series of international conferences organised in 2014, 2015 and 2016. Prominent speakers from the US, Greece, Germany, Belarus, as well as from Polish academic centres, a programme featuring training panels, including, for the first time, specialised workshops for nurses and midwives, as well as debates and discussions will undoubtedly make the Conference an excellent opportunity to expand knowledge on the development and writing of scientific publications, especially in the field of biomedical sciences, the preparation of the body of scientific work for evaluation, building an academic portfolio and the exchange of information in local and international scientific circles.

We would like to thank the University authorities for their continued support for the idea of organising the conference, lecturers for substantive support, patrons and donors for financial help and faith in the success of the project, participants for the interest and coming to Opole in such great numbers.

In the scientific section of the Quarterly, we present works on the significance of scientific research in the practice of family physicians, the development of research programmes at an American university, the creation of research networks based on practice in low-income countries, achieving a balance between research, teaching, clinical work and family life, the principles of good publishing practice on the example of epidemiological studies, the most common English language pitfalls in research, as well as useful bibliographic tools in the work of researchers. An interesting supplement will be the example of building a scientific career by a graduate of the Public Higher Medical Professional School in Opole. We hope that this section of the publication will meet the expectations of people, particularly of young researchers, who are increasingly willing to submit their manuscripts to our Quarterly. We also encourage you to familiarise yourself with the works on the always relevant issues

of frailty syndrome in the elderly, including the principles of prevention of this syndrome and ICT and environmental support for patients with this syndrome. A broader discussion of the issues will take place during the Frailty Syndrome Symposium, which will accompany the *4th International Conference of the Medical Science Pulse*.

We invite you to actively cooperate with the Editorial Board and publish your works in *Medical Science Pulse*!

The tasks – development of English-language articles published in the *Medical Science Pulse* quarterly, participation of renowned foreign scientists in the academic board of the *Medical Science Pulse* quarterly, implementation of procedures to secure the originality of articles published in the *Medical Science Pulse* quarterly, digitisation of the *Medical Science Pulse* quarterly – are financed as part of agreement 583/P-DUN/2016 from the funds of the Minister of Science and Higher Education for the dissemination of science.

Szanowni Państwo, Pracownicy, Absolwenci i Studenci Szkół Wyższych, Czytelnicy i Sympatycy *Medical Science Pulse*!

Z prawdziwą satysfakcją informujemy, że po pięciu latach wydawania kwartalnika naukowego *Puls Uczelni*, w związku z umiędzynarodowieniem oraz dynamicznym rozwojem czasopisma spełniającego w coraz większym zakresie profesjonalne kryteria oceny ekspertów w zakresie nauk medycznych, Zespół Redakcyjny podjął decyzję o zmianie tytułu z *Puls Uczelni* na *Medical Science Pulse*. Mamy nadzieję, że ta zmiana pozwoli na większą indywidualizację i lepszą identyfikację na rynku czasopism naukowych, a także specjalizację tytułu w prezentowanym obszarze badawczym. Nowa szata graficzna kwartalnika podkreśli nową jakość działania od roku 2017!

Zeszyt pierwszy towarzyszy *IV Międzynarodowej Konferencji Medical Science Pulse. Młodzi naukowcy – od magistra do habilitanta*, organizowanej pod patronatem JM Rektora PMWSZ w Opolu, będącej kontynuacją cyklu międzynarodowych konferencji *Pulsu Uczelni* organizowanych w latach 2014, 2015 i 2016. Wybitni prelegenci z USA, Grecji, Niemiec, Białorusi i polskich ośrodków naukowych, panele szkoleniowe, w tym po raz pierwszy specjalistyczne warsztaty dla pielęgniarek i położnych oraz debaty i dyskusje bez wątpienia sprawią, że Konferencja będzie doskonałą okazją do poszerzenia wiedzy na temat opracowania i pisania publikacji naukowych, zwłaszcza w zakresie nauk biomedycznych, przygotowania dorobku naukowego do oceny, budowania naukowego portfolio, wymiany informacji w lokalnym i międzynarodowym środowisku naukowym.

Dziękujemy władzom Uczelni za nieustającą przychylność dla idei organizacji konferencji, wykładowcom za wsparcie merytoryczne, patronom i darczyńcom za pomoc finansową i wiarę w powodzenie przedsięwzięcia, uczestnikom za zainteresowanie i tak liczne uczestnictwo.

W części naukowej kwartalnika prezentujemy prace poświęcone znaczeniu badań naukowych w praktyce lekarzy rodzinnych, opracowaniu programów badawczych na amerykańskiej uczelni, tworzeniu sieci badawczych opartych na praktyce w państwach o niskim dochodzie, osiąganiu równowagi między prowadzeniem badań, nauczaniem, pracą klinicysty i życiem rodzinnym, zasadom dobrej praktyki publikacyjnej na przykładzie badań epidemiologicznych, najczęstszym pułapkom języka angielskiego w badaniach naukowych oraz użytecznym narzędziom bibliograficznym w pracy naukowca. Ciekawym uzupełnieniem będzie przykład budowania kariery naukowej absolwentki Państwowej Medycznej Wyższej Szkoły Zawodowej w Opolu. Mamy nadzieję, że ta część publikacyjna zaspokoi oczekiwania szczególnie młodych badaczy, którzy coraz chętniej składają swoje manuskrypty w naszym kwartalniku. Zachęcamy ponadto do zapoznania się z pracami dotyczącymi niezwykle aktualnej problematyki zespołu słabości u osób w podeszłym wieku, w tym zasad prewencji oraz wsparcia ICT i środowiskowego dla pacjentów z tym zespołem. Szersze ich omówienie będzie miało miejsce podczas sympozjum na temat zespołu słabości, które towarzyszyć będzie *IV Międzynarodowej Konferencji Medical Science Pulse*.

Zapraszamy do aktywnej współpracy z Redakcją oraz publikowania prac w *Medical Science Pulse*!

Zadania: opracowanie wersji anglojęzycznych artykułów publikowanych w kwartalniku *Medical Science Pulse*, udział uznanych zagranicznych naukowców w składzie rady naukowej kwartalnika *Medical Science Pulse*, wdrożenie procedur zabezpieczających oryginalność artykułów publikowanych w ramach kwartalnika *Medical Science Pulse*, digitalizacja kwartalnika *Medical Science Pulse*, finansowane są w ramach umowy 583/P-DUN/2016 ze środków Ministra Nauki i Szkolnictwa Wyższego przeznaczonych na działalność upowszechniającą naukę.

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DEVELOPING FAMILY PRACTICE RESEARCH: RECOMMENDATIONS FOR YOUNG RESEARCHERS FROM A RESOURCE-LIMITED COUNTRY

ROZWÓJ BADAWCZY W PRAKTYCE LEKARZA RODZINNEGO: ZALECENIA DLA MŁODYCH NAUKOWCÓW POCHODZĄCYCH Z KRAJÓW O OGRANICZONYCH ZASOBACH

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A – przygotowanie projektu badania | study design, **B –** zbieranie danych | data collection, **C –** analiza statystyczna | statistical analysis, **D –** interpretacja danych | interpretation of data, **E –** przygotowanie maszynopisu | manuscript preparation, **F –** opracowanie piśmiennictwa | literature review, **G –** pozyskanie funduszy | sourcing of funding

SUMMARY

The importance of research in family practice is widely acknowledged by leading international organizations and is recognized as a fundamental element for improving the quality of health care provision. Early-career family practice researchers often face significant difficulties related to lack of training, resources and capacity. The aim of this paper is to present the experiences gained from a country of limited resources and to provide practical guidance for young researchers to strengthen their research competencies by expanding their professional networks, utilizing funding sources and effectively presenting their research findings to the public and the international scientific community. Young family practice researchers, in particular those working in low-resource settings, may encounter many diverse obstacles from the start of their career, and actions to strengthen research capacity is needed around the world to assist in mitigating these barriers. There is, however, a great deal young researchers can achieve, despite the potential difficulties. Based on our research experience and knowledge gained in building a successful family practice research network in a low-resource country, we have attempted to offer some practical recommendations to enhance the personal competitiveness and capacity of young family practice researchers. Not to be forgotten, however, is that passion and enthusiasm will always be key factors in improving health care globally.

KEYWORDS: research in the field of healthcare, family practice, capacity building, funding, science publishing

STRESZCZENIE

Znaczenie badań w praktyce lekarza rodzinnego zostało powszechnie uznane przez czołowe organizacje międzynarodowe i uważane jest za podstawowy element poprawy jakości opieki zdrowotnej. Lekarze specjalizujący się w medycynie rodzinnej będący u progu swojej kariery naukowej często napotykają znaczne trudności związane z brakiem szkoleń, zasobów i umiejętności. Celem niniejszej pracy jest przedstawienie doświadczeń zdobytych w kraju o ograniczonych zasobach oraz przekazanie praktycznych wskazówek młodym naukowcom, aby zwiększyć ich kompetencje badawcze poprzez poszerzenie sieci kontaktów zawodowych, wykorzystanie źródeł finansowania i skuteczne prezentowanie wyników badań opinii publicznej oraz międzynarodowej społeczności naukowej. Młodzi naukowcy z praktyk lekarzy rodzinnych, zwłaszcza pracujący w warunkach niskich zasobów, mogą napotkać wiele różnych przeszkód od początku swojej kariery, a działania na rzecz zwiększenia potencjału badawczego są niezbędne na całym świecie, aby pomóc im złagodzić te bariery. Mimo potencjalnych trudności, wielu młodych naukowców może to osiągnąć. W oparciu o nasze doświadczenie w dziedzinie badań i wiedzę zdobytą w tworzeniu udanej sieci badań w zakresie praktyki rodzinnej w kraju o niskich zasobach staraliśmy się zaproponować praktyczne zalecenia mające na celu zwiększenie konkurencyjności osobistej i potencjału młodych badaczy praktyk rodzinnych. Nie można jednak zapominać, że pasja i entuzjazm będą zawsze kluczowymi czynnikami poprawiającymi opiekę zdrowotną na całym świecie.

SŁOWA KLUCZOWE: badania naukowe w dziedzinie opieki zdrowotnej, medycyna rodzinna, budowanie potencjału, finansowanie, publikowanie w nauce

Introduction

The value of research in family practice is widely acknowledged by world-class organizations, such as the World Organization of National Colleges and Academies and Academic Associations of General Practitioners/ Family Physicians (WONCA), who have highlighted the fundamental role of family practice research in improving health care worldwide [1]. Especially in the recent years of global economic recession, the importance of family practice research in enabling clinicians to provide sound and valid evidence for high quality, everyday clinical practice is well justified and recognized [2].

Choosing a career in family practice research is a rewarding yet challenging decision. The continuous changes occurring in socio-economic and political contexts often have an impact not only on global health, but also on individuals' preferences and career paths. Innovative solutions need to be explored, and international and interdisciplinary collaborations and networking are more necessary than ever. In this sense, a young medical researcher can explore an exciting and promising field, with significant opportunities for personal and professional development.

However, there are many barriers that may hamper the progress of young researchers, especially in developing countries, where the significance of family practice research may still be unrecognized [3]. Limited resources and capacity often prevent young researchers from producing high-quality work. Lack of funding and weak administrative support may also contribute to excessive workloads and anxiety, reducing their productivity and enthusiasm for research. Difficulties may exist from their years of education, since both personal or institutional economic difficulties and potential deficiencies in educational systems may result in insufficient training, as well as the lack of opportunities to engage in research.

This paper focuses on early-career family practitioners and researchers who are challenged from the beginning of their professional and academic careers. We present the experiences gained in a low-resource country and provide practical guidelines and recommendations for young researchers to enhance their personal research competencies, capacity and academic competitiveness. We also intent to give prominence to the necessity of boosting research in family practice and offer guidance to practitioners who may be interested in pursuing a career in family practice research.

Capacity building in family practice – what has been learned?

In low-resource settings, lack of funds and infrastructure, limited access to technology and information and lack of scientific networking may be a few of the factors impeding involvement in high quality research [4]. One of the primary focuses of the WONCA conference held in Kingston, Canada in 2003 was to strengthen research around the world, taking into account the specific needs of each country [1]. Several integrated capacity building models were presented, leading to the formation of the "Three General Objectives for Capacity Building", which make up the main aspects of any capacity building strategy. These objectives include: creating solid links between clinical practice and research, reinforcing networking and the collaborations of family practice researchers with scientists from diverse disciplines and improving the training and career opportunities of family practice researchers. In addition, nine recommendations were issued in order to broaden the knowledge base and capacity of family practitioners. These recommendations stressed the importance of developing national organizations focused on family practice research, promoting research expertise and dissemination of research results internationally, facilitating the funding of research collaborations and establishing practice-based research networks (PBRNs) worldwide.

PBRNs consist of groups of community-based primary care providers which collaborate in order to provide answers to health-related questions and translate research into practice [5]. Apart from facilitating research, they also serve as peer groups, motivating professional evolution through mutual feedback and support. The development of PBRNs is crucial for the continuous improvement of the quality of primary care services and research [1]. The European General Practice Research Network (EGPRN), in co-operation with the European Rural and Isolated Practitioners Association (EURIPA), have explored the idea of a PBRN connecting family practice scientists throughout Europe and have concluded that such an effort may be both feasible and necessary for promoting health in remote areas with limited resources [6].

The successful establishment of a PBRN on the island of Crete in Greece may serve as a practical example of capacity building efforts in a low-resource setting. The Cretan PBRN was established in 2006 and consists of family practitioners working in rural areas that share a common interest in tackling the clinical and research challenges in Crete [7]. The PBRN has been very active in research and has produced several publications [8–10]. A stepwise model was implemented in Crete in order to create the PBRN, which involved a set of actions which placed scientific networking, knowledge of local circumstances and recording of patients' data and health needs as prerequisites for developing family practice research [11]. The PBRN's sustainability offers evidence of these steps being important components for implementing research in a low-capacity country that may be replicated elsewhere.

Practical guidelines and recommendations for young researchers to take into consideration when designing and implementing research

Lessons learned from the collaborative efforts in Crete suggest that despite the many challenges, there

are certain steps that young researchers may take into consideration in order to a build a research strategy and enhance their international competitiveness. These steps include:

1. Thinking about research questions and raising ideas for research;
2. Developing links and networking;
3. Formulating study hypotheses and discussing study design;
4. Engaging communities, raising their awareness about the study's purpose and inviting them to support the research;
5. Implementing and evaluating research;
6. Reporting research findings.

An essential perquisite for being able **to think about research questions and raise ideas** is to formulate an overall view of the local circumstance and the health needs of the population [12] and to have sufficient knowledge of similar situations globally. It is also crucial to be able to prioritize local health needs [12] and to explore what is already known from national and international literature. This combined with one's existing research and clinical background could lead to the identification of potential gaps in knowledge or experience that could be addressed by an innovative research proposal. One of the barriers that may be encountered in countries with low resources is a lack of local data and registries, as well as insufficient technological infrastructure [4] that could limit access to online versions of renown journals and biomedical databases, such as the PubMed (https://www.ncbi.nlm.nih.gov/pubmed), Scopus (https://www.scopus.com/) and Embase (https://www.embase.com/login). Recommendations that could be helpful here include:

a. Get to know the local population and identify research opportunities by sincerely listening to and understanding the needs of local populations;
b. Carefully search for all available data, either clinical or research-based, and explore regional registries, as well as international reports;
c. Develop affiliations with a research organization, either an academic or an independent institution, in order to maximize one's access to technology and information;
d. Develop affiliations with a research organization, either an academic or an independent institution, in order to maximize one's access to technology and information.

As soon as an individual has become affiliated with a research institution, it is important to **develop further links and networking** that could facilitate mutual exchange of knowledge and team-based research. Lack of official networks interested in providing support for research activities is a common limitation faced in low-resource areas. However, as mentioned above, the importance of networking has been stressed by the WONCA Kingston conference and is in line with previously reported models for conducting family practice research in low-resource settings [1,7,11,13]. Suggestions for early-career family practice researchers may include:

a. Initiate collaborations with other family practitioners who share similar visions and become part of local PBRNs (if one exists);
b. Create links and networking by actively participating in any existing European or international scientific groups and networks.

Collaborations and networks can facilitate the **formulation of study hypotheses and discussions concerning study design**. Planning research includes setting realistic goals, taking into consideration several issues of appropriate, feasible and acceptable methodology, both for the researchers and for the population from which the data will be collected [13,14]. However, prior to any discussions regarding the choice of the adequate methodology, young researchers may need to decide on the solid theoretical reasoning that will guide their study. Potential issues that may arise here include the fact that many young researchers or physicians working in deprived areas might not have sufficient training in research design using appropriate techniques and theoretical reasoning [15]. A few recommendations that may be suitable in addressing these limitations are to:

a. Utilize available programs for continuous education and professional development, as well as existing international exchange programs (such as the Erasmus program, etc.), in order to obtain funded training or work experience in different settings;
b. For behavioral research studies, one should familiarize themself with the theories provided by social and behavioral sciences, such as the Theory of Planned Behavior [16] and the Health Belief Model [17], in order to properly support the research;
c. Engage individuals from one's scientific networks and learn from their experience in order to develop a research plan, taking into account all the available resources and needs of the population.

Scientific collaborations alone, however, will not ensure the success of planned research, since the **engagement of local communities** is another important component of successful research implementation. Experience has shown that cultural issues related to data collection procedures, as well as negative attitudes towards research, may hamper the progress of research. Scientific processes, such as Participatory Learning Action (PLA) [18] and Normalization Process Theory (NPT) [19], may significantly facilitate the effective engagement of individuals and communities [20]. Recommendations for overcoming such barriers include:

a. Inform the community about study purposes through face-to-face meetings with formal community representatives and through meetings with members of the community;

b. Ensure that one's results will benefit the community and search for potential incentives that will be ethical and adequate to enhance the community's trust;
c. Invite the community to actively participate and support the research;
d. Utilize well-established approaches, including PLA and NPT, to engage local stakeholders.

Implementing and evaluating research is one of the most challenging aspects of building a research strategy. As soon as a young researcher has planned their research according to the abovementioned steps and has finalized a novel proposal, funding for implementation will need to be secured. In low-resource settings, lack of funding is one of the major factors limiting research [4]. While there are plenty of ways to pursue research funding, lack of experience on how to apply may often be a barrier to securing necessary funding support. The following recommendations may assist in guiding young researchers when seeking to secure research funding:

a. Seek participation in national or international collaborative research grants in order to obtain more experience in the grant writing process and preparation of successful funding applications;
b. Make use of external sources, such as European funding calls and frameworks (e.g. HORIZON 2020, CHAFEA, etc.), following the steps presented in a previous publication [21];
c. Seek inclusion in an competitive international consortia in order to boost existing resources and increase scientific visibility;
d. Utilize available research capacity, especially PBRNs, to join collaborative research proposals in response to European funding calls.

Upon gaining funds and eventually conducting the planned research, it is essential to disseminate and adequately **report the research findings**. In order for research findings to be translated into health services and for them to be adopted by local communities, it is imperative to ensure the results are disseminated to all involved stakeholders, including community members, patients, local authorities and international bodies [1]. Publishing in high-impact journals is an important vehicle for facilitating the wider spread of research results; however, writing competitive scientific papers may not be easy, especially for young researchers [22]. Towards this goal, the suggestions below may be of assistance:

a. Throughout the project, report back to the community and utilize their feedback to maximize the utility and adoption of the research;
b. When preparing publications and reports, ensure the results are sufficiently described using available guidelines, such as those of the EQUATOR network (http://www.equator-network.org/), in order to increase the probability of publication and subsequent translation into clinical practice or policy;
c. Visit the steps that were published in the previous report [22].

Experience from membership on the editorial boards of renowned journals has shown that reporting research findings, i.e. writing scientific papers, is a procedure that is challenging for young researchers, especially those working in low-resource settings. Apart from flaws in the presentation of papers, one can regularly observe serious issues in the research methodology, which may not allow for publication in high-impact journals [22]. The pitfalls presented in Table 1 summarize personal experiences encountered during years of editorial activity in several European and international journals. This is an attempt to highlight the most common reasons for not achieving high-quality papers and to provide a selection of real-life examples to avoid for young researchers who seek to be competitive during the demanding, yet necessary, race for publication and citation.

Table 1. Common pitfalls in reporting research findings.

Area	Pitfalls
Manuscript presentation	– Poor language – Lack of structure – Low resolution and lack of self-explanatory graphical presentations
Manuscript context	– Insufficient background information – Unclear aims – Lack of theoretical framework – Missing information on eligibility criteria and setting – Lack of non-response data – Unexplained recruitment – Lack of description of tool development – Unclear sample selection and sample size calculation – Inappropriate analysis
Interpretation of results	– Insufficiently explained results – Issues of generalizability – Limited clinical relevance/significance – Low quality discussion – Unreported impact/added value – Inadequately supported conclusions – Lack of ground for future research
General	– Not enough scientific significance – Unexplained terminology – Unreported ethics approval and informed consent acquisition – Missing references

In the context of the above pitfalls; young researchers may benefit from taking into consideration the following final key points when reporting research results in scientific papers:

a. Ensure that the abstract summarizes the paper adequately. This will be the window to one's work and the part that will predispose readers to the study and the value of the paper. It is essential that this be written clearly and concisely;
b. Report clearly in the introduction the overall aim and the secondary objectives of one's paper. It is important to present that one has an important and explicitly defined purpose for the research;

c. Describe the methods in detail, providing all the necessary information to prove that the approach to research is correct and in accordance with the aims;
d. Sufficiently present the main findings;
e. Explain the results logically and honestly. Prepare a thorough discussion that flows from the results; do not omit anything, and sincerely acknowledge all of the potential limitations of the study and provide grounds for future research.

Conclusions

Young family practice researchers, in particular those working in low-resource settings, may encounter many diverse obstacles from the start of their career, and actions to strengthen research capacity is needed around the world to assist in mitigating these barriers. There is, however, a great deal young researchers can achieve, despite the potential difficulties. Based on our research experience and knowledge gained in building a successful family practice research network in a low-resource country, we have attempted to offer some practical recommendations to enhance the personal competitiveness and capacity of young family practice researchers. Not to be forgotten, however, is that passion and enthusiasm will always be key factors in improving health care globally.

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BUILDING A RESEARCH PROGRAM AT AN AMERICAN UNIVERSITY: STRATEGIES FOR SUSTAINABLE SUCCESS

TWORZENIE PROGRAMU BADAWCZEGO NA AMERYKAŃSKIEJ UCZELNI: SKUTECZNE STRATEGIE

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A – przygotowanie projektu badania | study design, **B –** zbieranie danych | data collection, **C –** analiza statystyczna | statistical analysis, **D –** interpretacja danych | interpretation of data, **E –** przygotowanie maszynopisu | manuscript preparation, **F –** opracowanie piśmiennictwa | literature review, **G –** pozyskanie funduszy | sourcing of funding

SUMMARY

This informational article discusses opportunities and strategies for how to develop an externally funded research program in the American academic environment, specifically in STEM (science, technology, engineering, and mathematics) disciplines. It is presented from a long-term perspective of a faculty member with active research, who has served in all ranks (assistant, associate, and full professor) and has led a large academic department at the University of Arizona for several years. It is stipulated that the employment offer for a junior faculty include an adequate start-up package which allows to set the research program in motion by establishing a laboratory and hiring graduate students. The spectrum of funding sources for STEM research is given with a brief annotation of the current funding climate and mechanisms in the USA. As junior faculty face negative submission outcomes, strong encouragement and pragmatic advice is needed so that faculty can focus their efforts, persist in grant competitions, and ultimately succeed. Grant planning and submission suggestions that might help in this process and lead to good outcomes are given. The article concludes with the stipulation that faculty maintain high standards of academic integrity, ethics, and quality and not succumb to potentially perverse incentives to pursue funds just for the sake of generating higher quantitative indicators of their productivity.

KEYWORDS: funded research, research program support, grant competition, grants and contracts

STRESZCZENIE

Niniejszy artykuł opisuje możliwości i strategie tworzenia programów badawczych z zewnętrznym finansowaniem na amerykańskich uczelniach w dziedzinach ścisłych (nauki przyrodnicze, technologia, inżynieria oraz matematyka). Artykuł jest napisany z perspektywy wieloletniego pracownika naukowego, który prowadzi badania i przeszedł przez wszystkie szczeble kariery naukowej (asystent, profesor nadzwyczajny i profesor zwyczajny) oraz przez kilka lat stał na czele dużego wydziału na University of Arizona. Propozycja umowy zatrudnienia dla młodszego członka kadry naukowej powinna zawierać odpowiedni pakiet początkowy, który umożliwia rozpoczęcie programu badawczego przez otwarcie laboratorium i zatrudnienie laborantów spośród studentów. Spektrum źródeł finansowania badań w zakresie nauk ścisłych jest opisane wraz z krótką wzmianką o obecnym klimacie finansowym i mechanizmach finansowania w USA. Ponieważ młodszy członek kadry naukowej zmierzy się niejednokrotnie z odmową przyznania środków, będzie potrzebować zachęty oraz pragmatycznych porad, które pomogą skupić wysiłki, wytrwać i nadal startować w konkursach dotacyjnych, co ostatecznie zaowocuje uzyskaniem finansowania. Niniejszy artykuł zwiera również sugestie, jak planować granty i składać wnioski. Na zakończenie autor wnosi o to, żeby kadra naukowa zachowała wysokie standardy akademickiej uczciwości, etyki i jakości oraz nie ulegała pokusie pozyskiwania środków finansowych jedynie w celu generowania wyższych wskaźników swojej produktywności.

SŁOWA KLUCZOWE: finansowane badania, wsparcie dla programu badawczego, konkursy dotacyjne, granty i umowy

Introduction

The old "publish or perish" adage of American universities has been to some extent supplemented by "bring money or you are out" "existential" anxiety among junior faculty, especially in STEM related fields. Graduate students are not typically funded by the departments of their major field of study. The exception are those who have Teaching Assistant contracts (such financial arrangements also offset most of the tuition costs), or fellowships, or purse the degree part time and are supported by their employer. Therefore, having external, i.e., grant or contract monies is a necessary condition for a faculty member to build and sustain a research program. This entails the ability to financially support master's and doctoral students, to purchase laboratory equipment and supplies, fund conference and research meetings travel, etc. In essence, as such expenses are nowadays hardly ever covered by one's home department, a faculty in a way directs a small "enterprise" whose sustainable success very much hinges on the availability of funds to support the above mentioned operational facets.

In addition to this well established and time-tested model – which, by the way, gives faculty in all ranks quite a bit of autonomy in how their research program is run in terms of both the scale and subject areas – the changing dynamics of state, tax payer funded university budgets and how college and department units partake in such budgets, is putting an increasing pressure and emphasis on bringing more and more research funds. Such external funds can help offset some of the lacking state money.

In what follows, we describe how junior faculty go about "starting up" a program and what mechanisms can be used to purse research funding and sustain it once a research laboratory and team have been established. We also discuss how to avoid some pitfalls associated with hyper-competitive academic climate and conclude with a call for a healthy balance in academic endeavors.

The Hire

Typically, most faculty commence their academic careers immediately after obtaining their doctoral degree (PhD) either as assistant professors or, increasingly in STEM fields as post-graduate fellows ("post-docs", in casual parlance). Post-doctoral experience allows them to build up a stronger publication record, have a supervisory role in advising graduate students in the host's laboratory, and to hone their skills in grant proposal writing. In addition, working under an experienced faculty's supervision provides an excellent insight into how an established research program is run.

The hiring process usually begins in the Fall semester, with most of the interviews conducted in the Spring, and job offers being extended prior to the Summer months. A generous "start-up" package [1] is a *sine qua non* element of such offers as it enables the prospective faculty to establish the foundations of the research program and set up a physical laboratory space. Clearly, it varies in its specifics depending on one's discipline and the nature of his or her scholarly work. For instance, a faculty whose work is highly experimental may require funds close to $1Mil., whereas for more basic, theoretical research several hundred thousand dollars might be sufficient.

Offers in engineering and sciences also include, as part of the start-up, support for graduate students for a period of time, summer salary for two or three years (academic year contracts cover nine months of salary with the ability to supplement the additional three summer months from externally funded research), reduced teaching loads for the first five years while in the rank of non-tenured assistant professor, and miscellaneous operational funds. In essence, a good support foundation is laid out for an incoming faculty, from which a research program can and is expected to be built.

Indeed, with such offers, expectations are set that the faculty be successful not only in disseminating research outcomes in high quality scholarly media, but also that research funding will be secured to support the research in the long term perspective. Increasingly, such "return of investment" is expected in the more immediate future than the five year tenure-track probationary period of time. This, combined with the current funding climate (i.e., scarcity of funds) creates quite some high pressure and anxiety among junior faculty. Thus, the competition for funds commences.

The Pursuit

We do not focus here on strategies for writing successful grants and refer the reader to [1, 6] for details on how to prepare and submit successful proposals. Rather, we discuss potential pathways for securing and sustaining the funding.

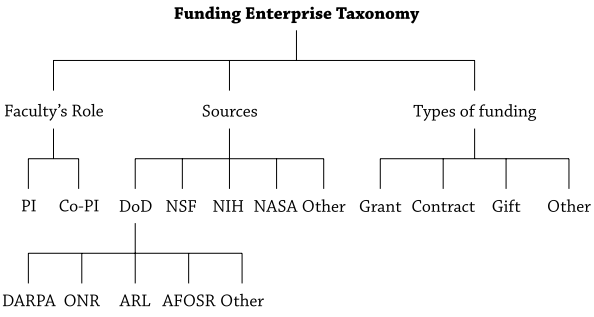

Figure 1. Taxonomy of the research funding enterprise

Most new faculty, especially those who have completed a post-doctoral assignment are quite familiar with the funding models. Still, they do face a number of choices in terms of a) what type of grants to pursue, e.g., basic, fundamental research or more applied projects, b) where to pursue such funding from, and c) who to team up with (or whether to submit single investigator proposals).

To help organize this spectrum of choices, in Figure 1 we have roughly categorized the dimensions of the research funding landscape. In it, faculty have often dual roles, both as Principal Investigators (PIs) and co-investigators (co-PIs). As the PI, they can act as sole investigators or leaders of a team. They can also team up with senior faculty or their peers to write collaborative proposals led by others. A good mix of roles is encouraged. Serving as the project's PI demonstrates the ability to attract funding for one's own research directions and ideas. It also shows leadership. Serving as a co-PI, attests to the ability to work with and contribute to a larger team. Historically, senior faculty would often involve younger colleagues in already established programs (assuming a synergy of interests and skill sets) in order to provide the initial, foundational basis for junior faculty research development. This model is still very much in place, typically in academic units with larger centers and strong senior faculty driven research programs. It serves well as a supplement to the start up funds discussed above.

Specific types of grants are exclusively designated as single PI projects. These, for example, are CAREER awards from the National Science Foundation [2] or the Young Investigator Award from the Office of Naval Research [3]. Such, highly competitive and prestigious, multi-year grants are de-facto enablers for building a successful long term research program.

The "what", "where", and "who" aspects of funding pursuits are inherently interconnected. Most large research universities provide good assistance to faculty at all ranks through the Office of Vice President for Research (or its equivalents) by notifications of new Requests for Proposals (RFPs), or Broad Agency Announcements (BAAs) from all the funding agencies, private foundations, and industry. (The author of this article, pioneered this concept at the University of Arizona by creating in 2005 the position of Research Development Director for his academic unit, whose responsibility was to assist all faculty in identifying the opportunities, connecting faculty with research program managers at funding agencies, and writing grant proposals. Since then, such positions have been created at both college and university administrative levels and have spurred additional research activities.)

Figure 1 lists major funding agencies in STEM. Traditionally, the National Science Foundation (NSF), National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA) fund basic research, with NASA often providing very large, multi million dollar support for missions such as for example OSIRIS-REX [4]. Department of Defense (DoD) has been one of the cornerstones of academic research funding. A great variety of grant opportunities exist through DoD. They are listed at [5].

The Defense Advanced Research Project Agency (DARPA) typically supports more application oriented work while the Office of Naval Research (ONR), Army Research Laboratories (ARL), and Air Force Office of Scientific Research (AFOSR) often seek proposals for foundational work. Other, smaller agencies typically focus on projects that meet their specific application needs. In addition, private sector entities provide opportunities to seek support through their research and development divisions. For instance, both Microsoft and Google corporations often announce competitions for special projects.

The funding vehicles are varied as well. They include grants (a norm for agencies such as NSF or NIH), fixed-price or time and material contracts, or at times gifts (from foundations, corporations, or philanthropic entities).

It is a given that there are truly numerous and very diverse opportunities to pursue research support, despite a rather high level of competition and limited funds available (and thus lower success grant award rates as opposed to two decades ago or so). Thus, the key question is: "How does a faculty become successful in winning and sustaining the funding?"

The fundamental prerequisites such as good, creative and novel ideas, well written proposals, an excellent, credible team with complementary areas of expertise and track records (Co-PIs who have a history of funding) must be in place for the proposal to competitive. This is elaborated on in detail in [6]. Here, we provide some personal observations and experiences that have served the author and his mentees well over the years. These observations follow the timeline of an assistant professor's career progression.

The first academic semester for a new assistant professor is a mixture of excitement, exhaustion, and clearly adaptation to a new environment (as a matter of principle and tradition, virtually all American universities do not hire their own graduates). The first order of business on the research side of one's responsibilities is to establish a laboratory and recruit graduate students using start-up funds. This will typically take a semester's worth of time. If the incoming faculty teaches a graduate level course in the area of his or her research, this might provide an opportunity to recruit students into the laboratory.

As the same time, proposal preparations begin as the faculty identifies the pending grant requests and starts building collaborative ties with colleagues in the department and across the university. (This latter aspect is important to note as many calls for proposal nowadays emphasize cross-disciplinary endeavors, often spanning diverse fields of scholarly inquiry.) In departments with a strong culture of mentorship and support for young faculty, senior colleagues often extend an offer to join an existing center, participate in an ongoing project, or team up on proposal preparations that they will lead.

Universities increasingly offer assistance through the Office of Vice President for Research workshops on proposal writing, budgeting, submission procedures, and, as mentioned before, help in identifying relevant requests for proposals from a broad variety of agencies, foundations, and the private sector.

As the academic year progresses, the work supported by start-up funds gains momentum and preliminary results, early publication drafts, and conference papers, form the foundation and evidence for ideas proposed in grant applications. Proposals are written and budgeted depending on the scope and available funds. Typically, faculty's summer months, graduate students' Research Assistantships, travel, equipment (if needed), and supplies are built into the budget. Some grants offset a portion of the academic year (AY) through what is called AY buyout. This allows the faculty at higher ranks to reduce their teaching load and dedicate more time to the project. In the author's department, 12.5% of the AY salary allows for a one course reduction in teaching. Budgets also include overhead (indirect costs), roughly in the 50% range of the direct costs.

Proposals get submitted and the anticipation begins. The evaluation process takes from a few to several months. (Some agencies, ask for a preliminary "white paper" proposal concept which serves as an early filter. Only 50% or 30% of white papers that have passed the preliminary evaluation get an invitation for the full proposal submission. This is a good process that speeds up the assessment cycle, and narrows the field of final contenders.) Decisions are more often than not negative – the odds of winning an award may be as low as the 5–8% range. "What now?", a disappointed and often frustrated junior faculty asks.

Persistence and Patience

However distressful negative submission outcomes might be, they are quite likely, given the highly competitive funding climate and statistically low odds of success (for excellent proposals, too).

Clearly, strong encouragement and pragmatic advice is needed so that junior faculty can focus their efforts, persist in grant competitions, and ultimately succeed. In what follows, we outline possible steps that might help in this process and lead to good outcomes.

- *Focus the efforts on the core areas of your expertise:* given the high pressure to attract external funding to the university, faculty often write numerous proposals taking a "shotgun" approach in hopes of perhaps being awarded one of them. This dilutes their efforts, and seldom results in good quality, well focused proposals.
- *Develop an excellent understanding of what the RFP calls for:* RFPs contain good but often broad descriptions of what the funding agency is seeking, what outcomes it expects. It is a good strategy to consult with Program Managers/ Directors responsible for a specific call to get detailed insights into what the scope, expectations, anticipated directions, and the program's long term strategic goals are. Examine current grants in the program to know what types of proposals won funding and who the investigators are.
- *Visit funding agencies:* "face time", direct personal interactions with Program Managers (PM) assist in understanding the scope of programs and RPFs as noted above. In addition, such meetings allow the PM to get to know the faculty, learn about their ideas and skill sets. Start-up funds can be used for travel to such meetings.
- *Team up with strong partners:* for a multi-investigator proposal, invite colleagues with excellent reputation and funding record to participate. Do this across the college, university and if appropriate involve collaborators from other institutions.
- *Follow-up with PMs on declined proposals:* proposal evaluations are shared with the PIs. It is imperative that the PI contact the PM to better understand which aspects of the proposal were competitive and which were not. Ask for guidance in revising the proposal so that it can be better focused and re-submitted in the next evaluation cycle.
- *Ask for exploratory/seed grant opportunities:* discuss with PMs a possibility for a small exploratory grant to prove your ideas. Grants such as NSF EAGER (Early-concept Grants for Exploratory Research) [7] provide small levels of funding but a short evaluation cycle, and higher odds of success.
- *Volunteer to serve on review panels:* offer your professional service as a reviewer on proposal assessment panels. This is an excellent opportunity to a) assist the agencies in the selection process and b) learn about how the peer review process works, what types of proposals get selected and why.
- *Take an active role in formulating RFPs:* as you establish professional relations with PMs, participate in workshops and conferences and offer your assistance in formulating directions for the program. This will position you well in how to best respond to potential calls for proposals.
- *Become a Program Manager:* as you mature in your professional career, gain tenure and get promoted to higher ranks, serve as a PM with a funding agency. These arrangements called Intergovernmental Personnel Act (IPA) Assignment [8] allow faculty to spend 3–4 years with an agency while retaining their academic positions. Acting as a PM is an opportunity to shape new research directions for the nation.
- *Sustain your efforts:* in the likely event that ultimately some of your proposals will get funded, do not rest on your laurels and plan accordingly for how to sustain, and grow the program. In essence, persistently continue executing all the above steps.
- *Do not give up!* However frustrating the process might be, good ideas and proposals get funded as evidenced by the many active projects all across the country.

Doing the "right thing"

Edwards and Roy [9] present a strong case for finding a better balance in how scholarly endeavors are incentivized and managed. They argue that the hypercompetitive academic environment, relentless pressure to bring in research dollars, quantitative metrics of productivity distort faculty's efforts and lead to substandard outcomes, decreased quality, and loss of integrity in academic conduct.

Junior, untenured faculty are vulnerable and very susceptible to such pressures as they structure their efforts in a manner that would lead to successful promotion and award of tenure. The burden of ensuring that they act with high integrity and a sense of purpose which aids their professional development falls on university administration and good mentors who should create a nurturing culture in the units. At the same time, it is important for the faculty to embrace the values of academic ethics, quality, and high standards, and to understand that good work combined with diligent efforts does get rewarded in the long run.

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BALANCING RESEARCH, TEACHING, CLINICAL WORK, AND FAMILY: NINE SUGGESTIONS FOR YOUNG PROFESSIONALS

RÓWNOWAGA POMIĘDZY PROWADZENIEM BADAŃ, NAUCZANIEM, PRACĄ KLINICYSTY I ŻYCIEM RODZINNYM: DZIEWIĘĆ SUGESTII DLA MŁODYCH NAUKOWCÓW

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A – przygotowanie projektu badania | study design, **B –** zbieranie danych | data collection, **C –** analiza statystyczna | statistical analysis, **D –** interpretacja danych | interpretation of data, **E –** przygotowanie maszynopisu | manuscript preparation, **F –** opracowanie piśmiennictwa | literature review, **G –** pozyskanie funduszy | sourcing of funding

SUMMARY

Balancing multiple professional roles and a family can be demanding. The current paper is a non-evidence based list of informal, anecdotal suggestions for professionals who strive to balance multiple work roles with the demands of raising young children. It is important to note I make no claims that this is an evidence-based method for achieving optimal work-family balance. Rather, I was invited to this conference to discuss my own experiences balancing work and family; this paper reflects that non-scientific aim, and includes a list of nine suggestions that I hope will be helpful to some. I am a licensed clinical psychologist in the United States. My primary position is as an associate professor at a mid-sized university, and my secondary position is as a clinical psychologist in the community. I am married and I have one child, and I recognize that the following suggestions might be most helpful to those who are demographically similar to me. The nine suggestions I propose include: 1) Be a single-tasker, 2) Use daycare hours wisely, 3) Establish parameters for your work email, 4) Outsource the chore you dislike most, 5) Designate a primary parent for discrete periods of time, 6) Play with your children, 7) Take good vacations, 8) Learn to say no, and 9) Attend to your own mental health. Each of these anecdotal suggestions is discussed in turn, and the interested reader is pointed to some empirical articles for further reading.

KEYWORDS: work-family balance, research, clinical work

STRESZCZENIE

Znalezienie równowagi pomiędzy życiem zawodowym i prywatnym może być trudne. Niniejszy artykuł jest nieopartą na dowodach listą nieformalnych, anegdotycznych sugestii dla osób pracujących zawodowo, które próbują znaleźć równowagę pomiędzy licznymi rolami w pracy oraz wychowywaniem dzieci. Pragnę podkreślić, że nie twierdzę, iż jest to oparta na dowodach metoda osiągnięcia optymalnej równowagi między życiem zawodowym i prywatnym; niniejszy artykuł jest przykładem nienaukowego ujęcia i zawiera listę dziewięciu sugestii, które, mam nadzieję, będą dla niektórych pomocne. Jestem dyplomowanym psychologiem klinicznym pracującym w USA. Na pierwszym miejscu jestem profesorem nadzwyczajnym na średniej wielkości uniwersytecie, na drugim klinicznym psychologiem w tej społeczności. Jestem mężatką, mam jedno dziecko, i jestem w pełni świadoma, że sugestie mogą być najbardziej pomocne dla osób ze zbliżoną sytuacją rodzinno-zawodową. Na dziewięć proponowanych przeze mnie sugestii składa się: 1) Skupiać się na jednym zadaniu naraz; 2) Rozsądnie wykorzystywać czas, kiedy dziecko jest w przedszkolu; 3) Ustalić parametry dla zawodowego e-maila; 4) Zlecić komuś najbardziej nielubiany obowiązek domowy; 5) Wyznaczyć głównego rodzica na różne okresy; 6) Bawić się ze swoim dzieckiem/dziećmi; 7) Wyjeżdżać na urlop wypoczynkowy; 8) Nauczyć się mówić „nie" oraz 9) Dbać

o własne zdrowie psychiczne. Każda z tych anegdotycznych sugestii jest kolejno omówiona, wskazuję również empiryczne artykuły do pogłębienia wiedzy dla osób zainteresowanych.

SŁOWA KLUCZOWE: równowaga między życiem zawodowym i prywatnym, prowadzenie badań, praca kliniczna

Balancing multiple professional roles and a family can be very demanding. Many researchers have documented the challenges inherent in work-family balance. Interested readers can find an abundance of information on the matter elsewhere , as the current paper does not serve as a review of this body of literature [1–4]. Rather, the current paper is an informal, personal list of suggestions for professionals with young children. As such, although some research is presented to support the suggestions contained herein, I make no claims that this is an evidence-based method for achieving optimal work-family balance. My experiences are purely anecdotal, and are shared with the hope that one or two of them may be of help to the reader. I am aware that my non-evidence-based suggestions may not be of use to everyone, and that they might be most relevant to those who are demographically similar to me.

Let me start by introducing myself: My name is Elizabeth Lefler, PhD, and I am a child clinical psychologist in the United States. My primary position is as a professor at a mid-sized public university where I am expected to A) conduct, present, and publish research, B) teach three classes per semester to students at the Bachelor's and Master's levels, and C) provide service to the university and my profession (e.g., advising psychology students, facilitating student groups, serving as a reviewer for peer-reviewed journals). Additionally, I am a licensed psychologist, so in my secondary position I am a clinician in a family practice (medical) setting in the community. My responsibilities in my clinical practice are to A) conduct diagnostic assessments on children with suspected mental health problems, B) provide therapy to families and children, and C) consult with physicians in the practice who have a question about matters of mental health. I am married, and my husband and I have a 3-year-old daughter. My husband is a middle-school science teacher.

The following are a list of nine tips and suggestions that have proven to be of use to me as I strive to balance research, teaching, clinical work, and my family:

1. Be a single-tasker. Despite popular claims to the contrary, cognitive psychologists have demonstrated repeatedly that multi-tasking reduces performance on all tasks, especially complex ones [5–6]. Thus, my suggestion is to dedicate clear, discrete blocks of time to one single task, do that task well and with all of your cognitive resources, and then switch to another task. For me this means setting aside a day for my clinical work, a day for my research, two hours on Mondays to prepare my courses for the week, etc. Try to set a single-tasking schedule and stick to it (and refer to tip #3 regarding setting parameters on email).
2. Use daycare hours wisely. We send our daughter to daycare approximately 35 hours a week. These 35 hours are precious; treat them as such. Your child/ren are well taken care of during this time, but it is expensive. Do not waste these precious hours on social media. Do not go out to lunch or coffee with colleagues on a regular basis. Of course it is possible to socialize with colleagues from time to time or to check social media every once-in-a-while, but for the most part when someone else is taking care of your child/ren, you need to use your time efficiently.
3. Establish parameters for your work email. I have two specific tips related to work email parameters, but even if these two tips won't work for you personally, I encourage you nonetheless to set email parameters that will. The bottom line is that non-stop email checking and responding can eat away at your productivity and family time. First, I suggest that you do not link your work email account(s) to your smart phone. I recognize that sometimes one needs to check work email from home or on the go, but make it a little more difficult for yourself to do so. Second, I recommend that you refrain from checking and responding to email for at least two hours each workday. Check and respond to emails when you have short breaks between meetings; not when you have two hours during which you could get a larger task done. These two specific email rules work well for me; determine which parameters will work for you and stick to them.
4. Outsource the chore you dislike most. Time is a commodity for professionals with young families, and if you absolutely hate cleaning your house or grocery shopping, for example, manage your budget so you can afford to have someone else take care of these tasks. There are numerous meal preparation, grocery delivery, cleaning, dog walking, landscaping, and other services available in most areas today. You do not need to use these services in perpetuity; but while your children are young and you are busy establishing your professional presence it could be worth it.
5. Designate a primary parent. For a discrete period of time, designate one parent who is in charge of the child/ren; and alternate. This primary parent is responsible for clothing, meals, naps, injuries, activities – everything. The secondary parent

then has the flexibility of either spending some low-stress time with the family or doing something alone such as working or exercising. As an example, my husband and I divide the weekend into four discrete time periods: before and after naptime on Saturday and Sunday (we refer to these four time periods as weekend quadrants). Each of us is the primary parent for two of the four quadrants. If I'm the primary parent for Saturday morning and I plan an outing to the Children's Museum, it's my responsibility to make the plans, get the child dressed, pack water and snacks, etc. My husband then has the option of coming along to the Children's Museum with low expectations (just fun with the family!), or he can stay home to grade exams, or go for a hike alone. This can be done on the weekends, the evenings, or both. I find that when we alternate the primary parenting responsibilities we are all happier with one another.

6. Play with your child/ren. Really play with them. Put your electronic devices down. Lay on the floor. Tell stories. Pretend. Read books. Be silly. Swing and run at the park. When you are with your kids, really be with them. Play is good for them and for you [7]. I also find that you will feel less guilt when you have to work a few extra hours if the time you spend with your children is really fun and engaging.
7. Take good vacations. Plan long vacations early and often, and try to work as little as possible while you are away. Set an automatic email response, spend a few extra hours the week before you leave delegating tasks so that you are not needed as much while you are gone, and try to really focus on your family. Eat good food and have fun.
8. Learn to say no. This is a difficult tip to follow, especially when – as an early-career professional – you are eager to please your senior colleagues. However, having a clear understanding of the additional responsibilities and committees that will help your career and/or prove to be meaningful to you in some way, versus those additional tasks that will not benefit you is paramount. If you are punctual and responsible you will increasingly be asked to take on more and more duties. You may need to say no to individuals who will be evaluating your performance which is a difficult task; but one that must be done.
9. Attend to your own mental health. This suggestions will mean something different for each person, but it is vital. Reflect on what you need to be content. You will not be successful at balancing work and family responsibilities if you fail to take care of yourself. For individuals without diagnosable mental illness, this likely means taking time for yourself to do things you enjoy. On the other hand, for those with diagnosed mental health concerns such as Major Depressive Disorder or Generalized Anxiety Disorder it is not this simple. Therapy and/or medication should be considered in consultation with your own mental health professional.

I hope my nine tips and suggestions have given you some ideas about how to realistically balance multiple professional roles and a young family. There is an abundance of additional information on achieving work-family balance should you wish to read further [8–9]. Please feel free to email me if you would like to discuss any of this in more depth: elizabeth.lefler@uni.edu. I wish you luck in your efforts to balance work and family successfully.

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CREATION OF PRACTICE-BASED RESEARCH NETWORKS IN RURAL AREAS IN LOW-INCOME COUNTRIES: ADVANTAGES AND DISADVANTAGES

TWORZENIE SIECI BADAWCZYCH OPARTYCH NA PRAKTYCE NA OBSZARACH WIEJSKICH PAŃSTW O NISKIM DOCHODZIE: ZALETY I WADY

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A – przygotowanie projektu badania | study design, **B –** zbieranie danych | data collection, **C –** analiza statystyczna | statistical analysis, **D –** interpretacja danych | interpretation of data, **E –** przygotowanie maszynopisu | manuscript preparation, **F –** opracowanie piśmiennictwa | literature review, **G –** pozyskanie funduszy | sourcing of funding

SUMMARY

A Practice-Based Research Network (PBRN) consists of a group of clinicians, practices or institutions that are devoted primarily to the delivery of patient care and are associated with one another in order to answer community-based health care questions and translate research findings into practice.

The main goal of PBRNs is to involve busy community-based clinicians in studies conducted by investigators experienced in clinical and health service research. Doctors are drawn to take part in PBRNs in order to provide answers relevant to their practice, with the goal of improving the quality of practice and the health of their community.

PBRNs provide access to phenomena often neglected by researchers, but which are of great importance to those directly affected by the issues being studied.

Practice-based research in family medicine is an important way to acquire new knowledge by the means and outcomes of family medicine practice.

Although Practice-Based Research Networks (PBRNs) are useful tools for conducting practice-relevant research in the busy primary care setting, their existence is threatened by a range of challenges, e.g. the limited financial support that rural areas have been receiving over the last few years, especially during this period of austerity in many countries within the European zone.

Recruitment difficulties are a major impediment, fuelled by general practitioners' time constraints, lack of remuneration, non-recognition and workforce shortages.

In conclusion, despite the difficulties and challenges that PBRNs are facing, clinicians as individuals and organizations like EGPRN and EURIPA are trying to establish such types of networks, especially in low-income countries, in order to enhance the improvement and delivery of rural health care.

KEYWORDS: rural health research, community network, primary health care

STRESZCZENIE

Sieci badawcze oparte na praktyce (PBRN) składają się z grupy lekarzy, praktyk oraz instytucji, które są zaangażowane przede wszystkim w zapewnienie opieki pacjentom i powiązane ze sobą tak, aby wyjść naprzeciw potrzebom opieki zdrowotnej społeczności oraz przekształcić wyniki badań w praktykę kliniczną.

Głównym celem sieci badawczych opartych na praktyce jest zaangażowanie klinicystów pochłoniętych pracą na rzecz społeczności lokalnych w badania prowadzone przez badaczy, którzy mają doświadczenie w dziedzi-

nie badań klinicznych i usług zdrowotnych. Lekarze są zachęcani do wzięcia udziału w działaniach sieci badawczych opartych na praktyce po to, aby mogli udzielić odpowiedzi na pytania ważne dla swojej praktyki, a tym samym poprawić jakość praktyki i stan zdrowia społeczności.

Sieci badawcze oparte na praktyce zapewniają dostęp do zjawisk często pomijanych przez badaczy, ale bardzo istotnych dla osób bezpośrednio związanych z badanymi kwestiami.

Badania naukowe oparte na praktyce prowadzone w dziedzinie medycyny rodzinnej są ważnym sposobem zdobywania nowej wiedzy zarówno na podstawie stosowanych procedur, jak i rezultatów uzyskiwanych w praktyce medycyny rodzinnej.

Chociaż sieci badawcze oparte na praktyce są użytecznymi narzędziami w prowadzeniu badań istotnych dla praktyki w dziedzinie podstawowej opieki zdrowotnej, ich istnienie jest zagrożone przez szereg problemów, takich jak ograniczenie wsparcia finansowego na obszarach wiejskich w ostatnich kilku latach, szczególnie w trwającym w wielu krajach Unii Europejskiej okresie zaciskania pasa.

Trudności z rekrutacją są główną przeszkodą powodowaną ograniczeniami czasowymi, jakim podlegają lekarze rodzinni, brakiem wynagrodzenia, uznania oraz niedoborami kadrowymi.

Podsumowując, pomimo niedogodności i wyzwań, które stoją przed sieciami badawczymi opartymi na praktyce, sami klinicyści oraz organizacje, takie jak EGPRN (Europejska Sieć Naukowa Medycyny Rodzinnej) i EURIPA (Europejskie Stowarzyszenie Lekarzy z Terenów Wiejskich i Izolowanych) próbują tworzyć ten rodzaj sieci, zwłaszcza w krajach o niskim dochodzie, aby poprawić jakość i zapewnić jak najlepszy dostęp do opieki zdrowotnej na obszarach wiejskich.

SŁOWA KLUCZOWE: badania zdrowotne na terenach wiejskich, sieć społecznościowa, podstawowa opieka zdrowotna

INTRODUCTION

Practice-Based Research Networks are defined as a group of clinicians, practices or institutions that are devoted primarily to the delivery of patient care and are affiliated with one another in order to investigate questions related to community-based practice. These networks are usually formal collaborations between community-based physicians and academic institutions: the physicians collect research data, and academic institutions have the staff and facilities required to design research studies and analyze, interpret and publish the data [1].

PBRNs have already proved to be both a place and a concept. As a place, they are laboratories for quality surveillance and research by meeting the population health needs, which assists the family physicians in their responsibility to improve frontline clinical care. Therefore, PBRNs are essential for continuous quality improvement in primary care. Over the last few decades, family medicine research has made notable progress, focusing on different aspects of primary care, such as public health issues, quality and clinical topics [2].

Practice-Based Research Networks (PBRNs) in family medicine, according to the definition by the Agency for Healthcare Research and Quality, "are groups of primary care clinicians and practices working together to answer community-based health care questions and translate research findings into practice", while they "engage clinicians in quality improvement activities and an evidence-based culture in primary care practice to improve the health of populations" [3].

Practice-based research in family medicine is an important tool and vehicle to gain new knowledge by the means and outcomes of family medicine practice [2]. It offers essential information for evidence-based family medicine and as such represents the impetus for quality improvement.

HISTORICAL ROUTE

Practice-based research in family medicine began in the 1970s in Europe and Australia and provided evidence that family physicians could generate clinically significant and scientifically sound data [4]. In Europe, PBRNs in primary care emerged in the 1990s in Belgium and continued extensively in the United Kingdom and the Netherlands [5]. Moreover, there are primary care PBRNs that have been set up in other European countries. There are some positive examples of Practice-Based Research Networks in rural areas of select European countries. These enable the study of primary care problems, as well as the process of continuing quality improvement within primary care settings. This enables every family physician to take a proactive role in developing the overall discipline of family medicine [2].

ADVANTAGES

Residents of rural and remote areas experience several barriers to high-quality health care, such as geographical barriers - the need to travel greater distances to access different points of the health care delivery system. This can be a significant burden in terms of both time and money. Health care facilities in these areas are small and often provide limited services. Often, due to geographic distance, extreme weather conditions, environmental and climatic barriers, lack of public

transportation and challenging roads, rural residents may be limited/prohibited from accessing health care services. Other barriers include unemployment, lack of insurance and poverty, social stigma and privacy concerns, as well as low patient ability to understand health information and instructions from their health-care providers. General practitioners working in rural settings often encounter limited resources or equipment and lack of continuous training. Adaptation of evidence-based interventions that are easily accessible and cost effective is therefore crucial for promoting both population health and professional capacity in such areas.

The major goal of PBRNs is to involve busy community-based clinicians in studies directed by investigators experienced in clinical and health service research. Clinicians are drawn to participate in PBRNs in order to answer questions directly relevant to their practice, with the goals of improving the quality of practice and the health of their community [6,7].

In a time where evidence-based primary care is a high priority, and there are many unanswered questions relevant to the development of PBRNs, particularly within countries with limited resources and under financial crisis, primary-care research is needed to inform clinical practices and to develop the evidence base of primary care [4,8]. Primary care research seeks to answer questions of immediate relevance to the health of the community and has been described as "the missing link in the development of high-quality, evidence-based health care for populations" [5].

Despite most clinical health research being hospital-based, primary health care is the part of the health system patients use most often. International studies show that the strength of a country's primary health care system is associated with improved population health outcomes for all-cause mortality, all-cause premature mortality, premature mortality from major respiratory and cardiovascular diseases (including stroke), cancer mortality, infant mortality, low birth weight and self-rated health [10,11].

PBRNs provide access to phenomena often neglected by researchers, but which are of great importance to those directly affected by the issues being studied. Local and regional networks - especially in rural areas - often maintain close relationships with their members, which facilitates study recruitment and retention. Due to shorter travel distances, they are able to achieve tighter oversight during intervention and data collection and have a more visible presence within the community of practitioners. They are also more likely to be aware of the needs and interests of their members, to more effectively increase the readiness and capacity of practice sites to participate in research and to build viable learning communities for dissemination of knowledge [15].

The ability of PBRNs to involve "real-world" practices in clinical research provides new opportunities to engage understudied populations, to study a range of health problems and to accelerate community adoption of new knowledge and best practices. Research and needs assessments can help determine where and how resources may best be targeted, and program evaluations can indicate whether a particular intervention or approach works well in a rural context, especially in low-income countries. PBRNs can draw on the experience and insight of practicing clinicians to identify and frame research questions so that new findings can be applied directly to clinical practice. The role of PBRNs continues to evolve in the direction of a stronger focus on health improvement, primary care transitions and providing continuing education and maintenance of certification [16,17].

For better implementation, PBRNs should work more closely with their sponsoring or home institutions so that they can benefit from the research expertise and financial support they offer and facilitate mutually beneficial and respectful academic-practice partnerships. Networks that make more sophisticated use of Health Information Technology (HIT) can maximize their research capabilities in difficult economic times. The widespread use of electronic medical records (EMRs), coding systems and the ability to digitally extract anonymized data provides modern PBRNs with unparalleled research opportunities. Networks that employ a wide range of recruitment techniques and focus on clinically relevant research questions will engage and motivate their members. As a result of their close relationship with practitioners, PBRNs are in a unique position to create meaning with carefully selected projects that connect busy practitioners to the larger primary care research agenda. Lastly, established networks that join or create a consortium of PBRNs can build on local strengths while reducing the workload on any individual network member. In these ways, PBRNs can meet the challenging environment facing them today [9].

In Europe, there are two successful organizations (networks) which could take a leading role: EGPRN and EURIPA. Both are well positioned to establish such a network. Its purpose could be to share best practices, demonstrate the current state of the matter, improve rural health care equity between countries, standardize terminology and the use of common electronic platforms, etc. However, the establishment of such a network requires a great deal of preparation and careful consideration.

ONGOING DIFFICULTIES

Although Practice-Based Research Networks (PBRNs) are useful tools for conducting practice-relevant research in the busy primary care setting, their existence is threatened by a range of challenges.

Busy clinicians struggle with daily practice concerns, while practice-based research faces ever more stringent oversight and restrictions. Funding streams are tight, and many networks face a shortage of experienced prin-

cipal investigators. Health resource allocation in most countries still favors hospitals and specialist care [9,12]. This applies to clinical services as well as research.

A survey of public expenditure on primary care research in Australia, New Zealand, the United Kingdom and the Netherlands found that the average was less than $1.50 per capita per annum, in contrast to the international average expenditure on health and medical research of $28 per capita per annum [13]. This difference in funding can be more evident within countries under economic crisis.

Regardless the size and importance of general practice and primary health care in the health care system, the research output of these sectors has been low internationally [3]. Namely, rural areas have received limited financial support, which is further escalated by the current financial austerity that now more than ever has reduced research capacity in family practice and primary care [2]. The place of residence and geographical factors play a role in the assessment of health status, health care utilization and health service deficits, adequacy of health care and health-related behaviors. As expected, residents of rural areas are being increasingly identified as individuals at risk of health disparities.

In certain European low-income countries, including Greece, such networks are established with especially great difficulty [8].

Although improving patient care requires a sound evidence base, rigorously designed studies remain under-represented in primary care research. The pace of research activity in general practice and the rate and quality of publications do not match the pace of structural change or the level of funding provided. Recruitment difficulties are a major impediment, fuelled by general practitioners' time constraints, lack of remuneration, non-recognition and workforce shortages [14].

In addition, smaller numbers of practices available to participate can limit the types of study designs in which regional PBRNs can participate and may impact the generalizability of research findings to other regions of the country or to other practice types or patient populations, and as such, this may result in a competitive disadvantage when it comes to funding. To overcome this challenge, regional PBRNs working together can increase the generalizability of practice-based research by increasing the number and diversity of the participating practices [15].

CONCLUSIONS

The role of PBRNs continues to evolve in the direction of a stronger focus on health improvement, primary care transitions and providing continuing education and maintenance of certification. PBRNs are growing in experience and research capacity, and they are adopting more advanced study designs, disseminating and implementing practice change, participating in clinical trials and providing an essential component of a learning health system. This can be very important in low-income countries, where limited resources can be overcome by effective evidence-based primary care. Infrastructure funding, support and compensation strategies remain the biggest challenges. A better understanding of how challenges such as member compensation, provider training and community involvement affect the capacity of practices to participate would advance the ability of PBRNs to fulfill the promise of supporting better science in primary care.

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ENGLISH LANGUAGE AND RESEARCH: THE MOST COMMON TRAPS

JĘZYK ANGIELSKI I BADANIA NAUKOWE: NAJCZĘSTSZE PUŁAPKI

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A – przygotowanie projektu badania | study design, **B –** zbieranie danych | data collection, **C –** analiza statystyczna | statistical analysis, **D –** interpretacja danych | interpretation of data, **E –** przygotowanie maszynopisu | manuscript preparation, **F –** opracowanie piśmiennictwa | literature review, **G –** pozyskanie funduszy | sourcing of funding

SUMMARY

English is commonly referred to as a "universal" language. Many people decide to study the language for a variety of reasons – to learn about a culture, to have a method of intercultural communication, to find a job, etc. In Poland specifically, students learn grammar and the theory of learning a language over the actual practice. As a result, common grammar mistakes occur throughout their learning process.

This paper presents a list of these common grammar mistakes that English learners make. It also includes tips on how to improve one's grammar and what to pay attention to.

KEY WORDS: culture, English as a second language, grammar mistakes, articles, prepositions, verb conjugations, countable nouns, transitional phrases

STRESZCZENIE

O angielskim często się mówi, że jest językiem „uniwersalnym". Wiele osób decyduje się studiować go z różnych przyczyn: by poznać kulturę krajów anglojęzycznych, zdobyć narzędzie do komunikacji międzykulturowej, znaleźć pracę itd. W Polsce, studenci poznają gramatykę oraz teorię uczenia się języka obcego równolegle z praktyczną nauką angielskiego. W rezultacie częste błędy gramatyczne towarzyszą im przez cały proces nauki.

Niniejszy artykuł przedstawia listę błędów gramatycznych popełnianych często przez osoby uczące się angielskiego oraz porady, jak poprawić swoją gramatykę i na co zwracać uwagę.

SŁOWA KLUCZOWE: kultura, angielski jako język obcy, błędy gramatyczne, artykuły naukowe, przyimki, koniugacje, rzeczowniki policzalne, frazy przechodnie

My name is Weronika Wasilewski and I am currently an English Teaching Assistant at the Wyższa Szkoła Filologiczna (WSF) in Wrocław, Poland. I am teaching English Conversation and American Studies to first, second and third year students working towards their Bachelor's degrees. My students vary in skill level and in age even within each school year, but altogether they are fairly advanced – starting with B1 and ending in native proficiency.

WSF specializes in languages – students have the option to study English, Spanish, German and Italian. Most students decide to study English and are interested in either British or American culture as well. Students take a variety of courses related to their language, ranging from grammar to culture to conversation to translation.

Students see language as a method and a tool to learn about the culture. Most study American English because they want to learn more about the United States. They watch American movies, listen to American music, read books written by American authors. Students are intrigued to compare every day American life to what they watch and hear about. By being able to actually communicate in someone's language, one learns much more than just the theory and conversational skills [6]. Language allows people to interact with one another and is used as an instrument of communication among people [7]. By learning a different language, you are learning what makes a culture so special and unique.

Polish students are also interested in studying and learning English for more instrumental purposes than

some other countries. They want to learn the language in order to go abroad and find a well-paid job, or get a promotion in their native country [3]. A major benefit of knowing a foreign language is this intercultural communication [6]. Every language includes such components as grammar, vocabulary and phonology. In order to be able to efficiently communicate, people should master the four skills involved with language: reading, listening, speaking and writing. Again, each skill requires practice and attention.

English altogether is not an easy language to learn. It is easy enough to get started and communicate the basics. But it takes years to learn the phrases and idioms, and all the various ways of using the language. Every foreign language learner commits errors. Learning a second language is a trial-and-error process compared to learning a first language. Errors occur because the learner does not know what is correct or may be directly translating from one language to the other [1].

As I mentioned previously, I am also teaching American Studies courses. Within this course I decided to focus on the American school system, teaching students about the structure and how it differs from what they grew up with. One major difference my students and I have noticed between the American school system and the Polish system is theory versus practice. My students all understand and have memorized grammar rules. However, they hardly ever have a chance to actually put this theory into practice [4]. Now that they have this opportunity, I am finding a few common grammar mistakes among every single year and age range. This is not an extensive list and not to say that everyone makes these mistakes. However, by being aware of them and knowing that they do exist, will make one a stronger researcher and English speaker.

Articles

One of the most common English as a second language (ESL) mistakes made is the tendency to confuse indefinite and definite articles. The Polish language does not have articles – they use the equivalent of "that" for everything and students may not fully understand the need.

Indefinite articles (*a* or *an*) are used to refer to a noun, where the specific identity is unknown. *A* is used for words that begin with a consonant sound and *an* is used for words that begin with a vowel sound. The definite article (*the*) is used for nouns that are familiar to the reader and writer. *A car* refers to a single unspecified car while *the car* refers to a specific car [5].

Students understand that *a* is used for a consonant sound and *an* is used for words that begin with a vowel sound. However, they struggle at times with differentiating between an indefinite article and definite. How do you know if something is unknown or known? Let us look at it like this: if you say you are taking *a car* to the grocery store, you are referring to any car. You can go to the parking lot and choose whichever you would like or take it from the street. Whatever car you choose; you are getting to the grocery store. However, if you are taking *the car*, you are taking one that is familiar to you. You are most likely taking the one that is in your driveway and you own [8].

Prepositions

There are over 150 prepositions in the English language. Students in the United States learn the prepositions and know from intuition what preposition goes with which verb. If someone asked me why sometimes it is *in a restaurant* and other times it is *at a restaurant*, I would not know how to respond. Both sound correct and are used in every day communication. This is why mastering prepositions is such a hard part of learning English – in some situations prepositions are interchangeable and in others they are not. It is not intuitive for anyone learning English, but there also are not many rules that go along with them in order to learn the theory when it comes to the interchangeable prepositions [2].

Prepositions are hard to assign a meaning to because of their often multiple and overlapping meanings as was in the case of *in a restaurant* and *at a restaurant*. Adding to this confusion, there can be regional variations in prepositions. For example, people in parts of the East Coast who are lined up to buy coffee at a café will say they are standing *on* line, while everyone else in the United States, will say they are standing *in* line. Both are grammatically correct; it is just a regional difference.

Verb conjugations

English learners are able to conjugate verbs correctly; however, they struggle matching the verb conjugation to a noun. I often hear *they has* instead of *they have* as one example. Students get the point across, but they are not matching the correct verb conjugation with the noun.

Another typical error regarding verb conjugations is using the present simple tense instead of the present perfect tense. For example, *I saw this movie* vs. *I have seen this movie*. These tenses are not used in the Polish language and are confusing to English learners. An example: I cleaned my house when my friend called me versus I was cleaning my house when my friend called me [8].

Countable nouns

A few nouns are countable in Polish, but uncountable in English. In Polish, you are able to quantify it and make it more tangible; however, when translated to English, the words are more abstract. Two countable nouns my students often get wrong are: advice and information. I often hear students say *informations* as a plural.

Another issue is that there are nouns which can be either countable or uncountable, depending on the sit-

uation. If you say "I had a turkey for lunch" it would mean you ate a whole turkey, rather than just a part of it. But if you say, "I had turkey for lunch", it would mean that you may have had a turkey sandwich or a part of the turkey. Students often forget to include additional words that would make the noun countable.

Transitional phrases

Lastly, a common ESL mistake I see, especially in writing, is a dependency on transitional phrases. Often in the English language, two related sentences do not need a transitional word to link them. However, students use these phrases in order to confirm relations and make their conversation or writing sound more professional.

This adds to the problem of wordiness. Students have issues trying to describe everything in one sentence when they could have done something more efficiently. Transitional phrases do not help with that – when writing, it is important to avoid wordiness and to be as compact and efficient as possible.

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EPIDEMIOLOGICAL STUDIES IN THE WORK OF YOUNG SCIENTISTS: GOOD PUBLICATION PRACTICES

BADANIA EPIDEMIOLOGICZNE W PRACACH MŁODYCH NAUKOWCÓW: ZASADY DOBREJ PRAKTYKI PUBLIKACYJNEJ

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SUMMARY

Epidemiological studies hold a significant position in the research conducted by young scientists. One of the key aims of establishing the epidemiology of non-communicable diseases is studying the incidence of features of states and events connected with health in specified populations. This in turn is closely connected with the assessment of factors affecting health, which is the basis of information used by health care providers and other institutions. Apart from planning and conducting studies, a young scientist has to describe and publish their results. Only a full publication in a peer-reviewed journal represents the highest scientific value. This paper presents epidemiology as a science and methodology by using definitions, classifications and main goals. The short depiction presents epidemiology as a tool for assessing the health of a society and describes the main good practices for publishing the results of epidemiological studies.

KEYWORDS: epidemiological studies, young scientists, publishing results

STRESZCZENIE

Badania epidemiologiczne zajmują ważną pozycję w pracach młodych naukowców. Jednym z najważniejszych celów epidemiologii chorób niezakaźnych jest badanie występowania cech stanów, zdarzeń związanych ze zdrowiem w określonych populacjach. To z kolei jest ściśle związane z oceną czynników wpływających na stan zdrowia, których znajomość jest podstawą informacji do wykorzystywania przez służbę zdrowia i inne instytucje. Młody naukowiec oprócz planowania i wykonywania badań musi opisywać ich wyniki oraz publikować w czasopismach. Tylko pełna publikacja w recenzowanym czasopiśmie ma największą wartość naukową. Artykuł przedstawia epidemiologię jako naukę i metodologię poprzez definicje, klasyfikacje i główne cele. W skrócie przedstawiono epidemiologię jako narzędzie dla oceny sytuacji zdrowotnej społeczeństwa i omówiono ważniejsze zasady dobrej praktyki publikacyjnej wyników badań epidemiologicznych.

SŁOWA KLUCZOWE: badania epidemiologiczne, młodzi naukowcy, publikacja wyników

Definition of Epidemiology and Epidemiological Studies in Modern Science

Epidemiological studies allow the researchers to obtain credible data [1]. In 1988 John Last defined epidemiology as "the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems" [2]. The term "epidemiology" is usually associated with communicable diseases and measures aimed at preventing their incidence and spread. Most of the severe communicable diseases were gradually contained and in some cases their incidence

was completely eliminated, which allowed the second half of the 20th century to be devoted to establishing the incidence and causes of non-communicable diseases, i.e. civilisation diseases. Thus, J. Zejda offers the following definition: "[e]pidemiology is a study of the incidence and determinants of various health-related states in specified populations and a system of actions utilising the obtained data to resolve health problems of a population". The second part of the definition, concerning application, refers to promoting health, preventing diseases, and to medical protocols based on scientific evidence [3].

One of the most important aims of the epidemiology of pathological phenomena is studying the incidence of features of health-related states and events in specified populations, combined with an assessment of health-affecting factors, which can lead to using the knowledge to control health problems [4,5]. For example, in a sphere important for people: calculating the level of prevalence of a disease, i.e. incidence and distribution of a pathology in a specified human population, and explaining the rules for establishing the causes of diseases, especially modifiable environmental factors [6,7]. The number of causal factors may vary for different diseases and medical conditions. Some are necessary for the disease or condition to occur, some only increase the risk of occurrence. Dedicated epidemiological and statistical methods are used to study these correlations and their impact.

To sum up, it can be stated that epidemiological studies constituted an explanation of the incidence and determinants of health-related phenomena in specified human populations and a system of actions utilising the obtained data to reduce the established health problems in a population.

Classification of Epidemiological Studies

General epidemiology concentrates on general, universal features governing the incidence and spread of diseases and on the methods (research tools) used in order to explore the scope of the subject. Detailed epidemiology concentrates on specific, well-defined health problems.

Epidemiological studies can be observational, i.e. not interfering with the natural course of events, when the researcher collects data and does not interfere, and experimental, requiring active participation of the researchers in changing the factors determining the disease, such as exposure or behaviours, or changes in the development of the disease, which through treatment and their schema are similar to experiments [8].

In the first type of studies, descriptive epidemiology is the most easily applied and most commonly used. The aim of such studies is characterising the incidence of a health-related event or a different parameter connected with a health-related event in a population. For young scientists, this type of epidemiological studies is usually the first stage of research, based on available data, which allows the analysis of cause and effect relations and observe whether the incidence of a given event is increasing or decreasing (has a tendency to increase or decrease).

However, it is analytical epidemiology that provides concrete evidence for the causes of an event. Using analytical epidemiology we assess the determinants of health problems, establish connections between the studied phenomena and environmental factors, interpret the observed connections in terms of cause and effect, which allows us to apply the study results in practice. Other types of observational studies provide interpretation of the correlations in the cause and effect category, analyse the connections between health and risk factors. The aims of different types of experimental studies are: assessing the state of health in a population and its dynamics, studying the connections between a disease and exposition to risk factors, studying the connections between a disease and its complications and treatment methods, establishing the effectiveness and costs of treatment methods, studying the effects of the incidence of a disease, developing guidelines for strategies fighting a disease, monitoring the effectiveness of health care strategy, assessing the effectiveness of the cost of introducing health care strategy.

Therefore, in order for epidemiological studies to have effect on the proper implementation of a prophylactic programme, they should cover significant subjects, which require studying for the benefits of the society. In some specialist areas, such as environmental and occupational medicine epidemiology, special care is placed on studying populations subject to risk factors and a specified type of environmental exposition [9].

Good Publication Practices and Disseminating the Results of Epidemiological Studies

Being a scientist is different from any other profession in one key aspect: apart from conducting studies and other types of research work, a scientist has to write about their results. Everything becomes clear once we have the knowhow and writing scientific publications is no exception [10].

Some of the reasons for publishing are:

1. We have study results we have to share with others
2. We are trying to enter the scientific circles of a given specialty and thus raise both our own prestige, and that of our research site
3. An academic paper is aimed not only at effective dissemination of knowledge, it also increases our scientific background and helps us increase our personal factors (the Hirsch index)

4. We improve our CV and our chances for obtaining a grant
5. We become better authors

What do we need to write an academic paper? The easiest formula is: *scriptio = scientia + ars + labor*.

These are the key basic features of good publication practices and general guidelines and tips, helping to prepare a paper with results of epidemiological studies (a so-called original paper). A paper ready for publication has to show its authors have good knowledge of the described topic, good research skills and interesting observations, with potentially significant implications. A good paper provides new information or new context for existing information [11]. Papers presenting results of epidemiological studies have an existing uniform format, known as IMRAD, which is an acronym composed of the first letters of the elements of a paper: Introduction, Methods, Results, and Discussion [12] with added Conclusions.

The title is very often the thing that encourages potential audience to read the paper (the title does not need to be final, it can change during the course of writing a paper). It should be precise and concise. It is a good practice to read the types of titles which usually appear in the journal we want to submit our paper to.

Original research articles are typically structured in this basic order [13]: Introduction: What did you/others do? Why did you do it? Methods: How did you do it? Results: What did you find? And Discussion: What does it all mean? This order is recommended by most English-language publications and one we are used to as authors and readers. A clear and concise style of the paper increases its chances of being read by a large number of interested readers. Elements such as elaborate language, complex comparisons, idiomatic expressions, metaphors and jokes render the reception of the results of the study less clear. Science is a serious subject, which requires clear means of delivery [14,15].

The style of a paper becomes a bigger challenge when we write in a foreign language. In such cases it is best to forgo translating even the best version of the manuscript and instead write in the target language from the start [16,17].

Writing a paper should commence from recalling the working hypothesis and preparing three key chapters, i.e. Introduction, Methods, and Results.

Introduction should contain the rationale for exploring a given subject and present the aim of the paper. We present the available knowledge and point out previously unknown items [18]. Furthermore, we should describe the used methods, which play a significant role in epidemiological studies. A well-prepared statistical analysis can greatly increase the chances for a paper to be published. The Results chapter should present the main conclusion of the paper without digressing to other subjects. We should organise the data into a logical construction, presenting the course of the study and the results [19].

The Discussion chapter differs from the Introduction: it begins with describing the results and then moves on to explain their significance in the broader context of the studied area. The main subject of the Discussion are own results. A well-executed discussion should focus on the key observations, circumventing the problematic findings, especially if they are not significant for the study hypothesis. At the end we should ask about the importance of our findings. What do they bring? Do they disperse doubts? Do they question the current knowledge? In the Conlcusions chapter we recap the results and present the final conclusion, e.g. the effect on future studies.

Final Remarks

Epidemiological studies are necessary to understand the way diseases and pathological events spread in a society. They increase the awareness of the current situation and the need to monitor it. They are also a source of analysis and data on the scope and scale of health problems in a population. By establishing and describing risk factors and assessing the situation, they allow to draw conclusions from past and potential future events. The epidemiological approach helps in making decisions regarding health-related policy and actions based on evidence, indicating prophylactic goals. All of that contributes to designing studies, and collecting and analysing data, and disseminating results via good publication practices. We have to remember that only a full publication in a peer-reviewed journal represents the highest scientific value. Clear reports from epidemiological studies should be accompanied by promoting such studies, which helps make the peer-review process, which is a part of promoting the study, more clear.

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FRAILTY SYNDROME IN COMMUNITY CARE: TIPS FOR PATIENTS AND CAREGIVERS

ZESPÓŁ SŁABOŚCI W OPIECE ŚRODOWISKOWEJ: WSKAZÓWKI DLA PACJENTÓW I ICH OPIEKUNÓW

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SUMMARY

Frailty syndrome is a dynamic condition characterized by a decrease in the physiological body reserves, weakened resistance to stressors and impaired functioning of the body systems. Frailty syndrome is expressed through weight loss, reduced muscle strength, problems with walking, maintaining balance and a decrease in physical activity. There are three stages of frailty syndrome: pre-frail, frail and complications of frailty syndrome. The main risk factor of the disease is old age, but genetic and environmental influences are also important, as well as lifestyle and co-morbidities. Diagnosis of frailty syndrome is made, among others, based on the Fried scale, the Rockwood scale and GFI (Groningen Frailty Index). The basis of prevention of frailty syndrome is regular physical activity and a combination of aerobic, strengthening and stretching exercises. The role of a diet containing foods rich in protein, vitamins, especially vitamin D, leucine and omega-3 is also emphasized. Besides these, vitamin D supplementation, treatment of co-morbidities and vaccinations to prevent infectious diseases should be taken into consideration. A huge role in the prevention of complications of the disease is played by the family and caregivers of the elderly, who should pay attention to the first symptoms of the disease and take steps to minimize the risk of frailty syndrome and to slow the disease.

KEYWORDS: frailty, epidemiology, diagnostics, treatment, prevention, caregivers

STRESZCZENIE

Zespół słabości (ZS) jest dynamicznym stanem charakteryzującym się zmniejszeniem fizjologicznych rezerw organizmu, osłabieniem odporności na czynniki stresogenne oraz zaburzeniami funkcjonowania układów ciała. W ZS dochodzi do zmniejszenia masy ciała i siły mięśniowej, problemów z poruszaniem się, utrzymaniem równowagi oraz do zmniejszenia aktywności fizycznej. Wyróżniamy trzy stadia zespołu słabości: wczesny ZS (*pre-frail*), zespół słabości (*frail*) oraz powikłania zespołu słabości. Głównym czynnikiem ryzyka wystąpienia ZS jest wiek podeszły, ale znaczenie mają również czynniki genetyczne, środowiskowe, styl życia oraz choroby współistniejące. Do rozpoznania ZS stosuje się m.in. skalę Frieda, Rockwooda oraz GFI (*Groningen Frailty Index*). Podstawą profilaktyki ZS jest regularna aktywność fizyczna, łącząca ćwiczenia aerobowe, siłowe i rozciągające. Podkreśla się także rolę diety zawierającą produkty bogate w białko, witaminy, zwłaszcza witaminę D oraz leucynę i kwasy omega-3. Poza tym należy zwrócić uwagę na suplementację witaminy D, leczenie chorób współistniejących oraz wykonywanie szczepień ochronnych zapobiegających chorobom zakaźnym. Ogromną rolę w profilaktyce i zapobieganiu powikłaniom tej choroby odgrywa rodzina i opiekunowie osób w wieku podeszłym, którzy powinni zwrócić uwagę na pierwsze jej symptomy oraz podjąć działania minimalizujące ryzyko wystąpienia ZS oraz spowalniające przebieg choroby.

SŁOWA KLUCZOWE: zespół słabości, epidemiologia, diagnostyka, leczenie, zapobieganie, opiekunowie

Introduction

Frailty syndrome, also defined as weakness syndrome, friability syndrome, fragility syndrome and exhaustion of reserves [1,2], is a dynamic state characterized by a reduction of homeostatic reserves [3] and diminished resistance to stress factors caused by the lowered capacity of the body systems [4]. The syndrome has a negative impact on the entire body of the elderly [5]. It is expressed through weight loss as a result of muscle mass reduction (sarcopenia), malnutrition, impaired balance, mobility problems, weakening of strength and endurance, slowdown of motor skills and a decrease in physical activity [2,4]. These disorders lead to a significant deterioration in the quality and satisfaction with life, intensification of symptoms of depression [3,6], an increased risk of falls, the need to use the help of others, disability, frequent hospitalizations and, ultimately, death [7].

There are three distinctive stages of frailty syndrome:

- pre-frail: clinically silent, physiological reserves of the body are on the verge of exhaustion, but are still sufficient to appropriately respond to pathogenic stimuli (acute illness, trauma, stress); a chance of complete recovery;
- frailty: recovery in the event of a new, acute illness, trauma or stress is slow and incomplete; functional reserves of the body are not sufficient to fully recover;
- complications of frailty syndrome: a significant increase in the risk of falls, functional disability leading to invalidity, polypharmacy, an increased incidence of hospitalizations, cross infections, institutionalization and, ultimately, the patient's death [8–10].

Epidemiology

Studies conducted in Europe show that the incidence of frailty syndrome varies - from 5.8% in Switzerland to 27% in Spain [11]. Dutch scientists have estimated the incidence of fragility syndrome among people over 65 years of age at 19%, while in the Spanish study of the population over 70 years of age, this figure was approximately 20% [12].

Research of the American population reported the incidence of frailty syndrome in the age group 65+ at 7%, and among those 80+ at 30% [13]. Other data from the United States revealed the presence of the syndrome in 3.9% of those aged 65–74 and in 25% among individuals aged 85 years and above. It occurs much more often in women (8%) than in men (5%) [11].

According to data, in the Polish population, the condition occurs in up to 40% of individuals aged 64–71 years [14].

Frailty syndrome often leads to death in the elderly. Research conducted in the United States in the years 1998–1999 indicated frailty syndrome as a cause of death in 27.9% of cases. For comparison, during this time, 21.4% of subjects died of internal organ failure, 19.3% of cancer and 13.8% of dementia [15].

Risk factors

Although the syndrome was reported in young patients of intensive care units [16], it has been finally accepted that old age is a significant risk factor for this disease [17]. With age, the susceptibility to stress factors increases, and physiological body reserves diminish, which contributes to the development of frailty syndrome [18]. Great significance is attributed to genetic and environmental factors, as well as lifestyle and comorbidities [17].

Pathophysiology

Proper cooperation between the immune and hormonal system is necessary to maintain homeostasis of the body [19,20]. In the elderly, dysfunctions of the immune system lead to an increased secretion of inflammatory markers. The susceptibility of the body to infections also increases, and permanent maintenance of inflammation contributes to numerous complications, such as chronic renal disease, cardiovascular disease, Alzheimer's disease and diabetes, as well as other pathologies associated with aging of the body [20,21]. A characteristic feature of frailty syndrome is the presence of coagulation and nutrition disorders (malnutrition, anorexia), as well as cognitive disorders as a result of chronic inflammation [2,15].

A decrease in the secretion of growth hormone, insulin-like growth factor IGF-1 [18] and the concentration of sex steroids (oestrogen, androgen, testosterone and DHEA) leads to disruption in the growth and regeneration of cells, a reduction of muscle mass and strength (sarcopenia), as well as a lowering of bone mineral density (osteopenia) [1,17,19,22]. Sarcopenia, which is one of the major disturbances in frailty syndrome, is defined as the progressive loss of muscle mass and strength. A key role here is played, however, by muscle strength, which explains the fact that frailty syndrome occurs even in obese patients [2,15]. Malnutrition in frailty syndrome causes: impaired immunity and function of the whole body, decreased muscle strength and psychomotor performance, as well as nutritional deficiencies. Additionally, sarcopenia and osteopenia, leading to osteoporosis, increase the risk of falls and injuries. Disability intensifies, as well as dependence on others. Patients often end up in long-term care facilities or die of complications [23,24].

Diagnostics

A plurality of scales is used to diagnose frailty syndrome. One of these is the Fried scale [25]. It consists of five criteria, wherein the presence of three constituents confirms the diagnosis of frailty syndrome, while the presence of one or two indicates the risk of frailty syndrome [4].

These include:

1. unintentional weight loss (4–5 kg per year);
2. weakening of the muscles, assessed based on the strength of the hand using a dynamometer (by 20% taking into account age and BMI *body mass index*) [1];
3. exhaustion - rated based on the CES-D Centre for Epidemiologic Studies-Depression Scale [26];
4. free gait speed - measured based on the speed of passage of 4.75 m (men: height ≤ 173 cm - time ≥ 7s, height >173 cm - time ≥ 6s, women: height ≤ 159 cm - time ≥ 7s, height > 159 cm - time ≥ 6s);
5. low physical activity - reduced number of calories burnt during the week - for women < 270 kcal/week, for men < 383 kcal/week [27].

Another scale is the 7-step Rockwood scale, which assesses the activity and independence of the elderly:

1. Very efficient - strong, physically active, energetic, well-motivated
2. Efficient - less efficient than in point 1 in the absence of the active disease
3. Efficient with the coexisting disease treated
4. Visibly sensitive with symptoms of the coexisting disease
5. Mild weakness - requires help from others in daily activities
6. Moderate weakness - requires assistance in daily and care activities
7. Strong weakness - totally dependent on others in all aspects of daily life or terminally ill [28]

To make a diagnosis of frailty syndrome, we also use the GFI *Groningen Frailty Index*, which evaluates: the ability of the patient to move, the efficiency of the senses of sight and hearing, nutritional status, co-morbidity, psychosocial aspects and physical fitness [27]. The questionnaire consists of 15 questions, and a positive response to 4 of them indicates the presence of frailty syndrome [29].

The role of a family and caregivers

In the first phase of frailty syndrome, with no symptoms of disability, it is essential to operate in two directions. On the one hand, measures should be taken to diagnose the condition early, and on the other hand, to introduce actions that could stop the progression of frailty syndrome [30]. Early detection of frailty syndrome and prevention of its consequences allow one to avoid complications and the loss of independence of the elderly [31].

The involvement of the family and caregivers of the elderly in active participation in care plays a huge role in the prophylaxis of this disease and can help to prevent progression if the disease occurs [32]. Special attention of the family and caregivers of elderly patients should be paid to: chronic fatigue, slowing of gait and weight loss [33]. In addition, the first warning signs of frailty syndrome in the elderly may include: the beginning of difficulties with the performance of daily living activities (dressing, washing, preparing meals and independence when leaving the house), urinary incontinence, abnormal defecation and balance disorders, which are more frequent than previously, as well as falls and gait disturbance.

Caregivers should also be aware of changes that may occur in the functioning of mental health. In patients with frailty syndrome, we can observe depression and sleep disorders [28]. The emergence of impaired memory, thinking, orientation, comprehension, learning and problems with associating and analysing information should also arouse the concern of caregivers [34].

Most important aspects of prevention and treatment of frailty syndrome

Physical activity

One of the basic and most effective methods of prevention of frailty syndrome is physical activity [1,35]. Research shows a number of positive changes taking place in the body as a result of regular, properly chosen physical activity. Its positive effects are especially emphasized on the musculoskeletal, endocrine and immune system [17,36]. An increase of endurance and walking speed, a reduced risk of falls and improved well-being are some of the benefits physical exercise brings [36]. The duration of training for individuals with frailty syndrome should be 30–45 minutes a day and 45–60 minutes for individuals in the early stage of the disease [35].

Physical activity in the elderly should consist of three main types of exercises: aerobic (endurance), strengthening and stretching. Training should begin with a warm-up [37] and then move on to aerobic exercises that raise the heart rate and prepare the muscles for strength training. Examples of aerobic exercise include walking in place, stationary cycling and climbing stairs [35]. The next step is resistance training, which increases the muscle mass and consequently the strength of muscles [38]. This involves making a series of movements using resistance, e.g. lifting weights [37]. Another important aspect of training should be practicing balance and equilibrium: a walk along a straight line, putting one foot after the other, standing on one leg [35]. Stretching exercises should complete each physical training [35,37].

Tai-chi is a form of the physical activity recommended by many scientists, which is safe and yields beneficial results. The calm, slow movements which are performed during the workout counteract the three components of frailty syndrome: weakness, slowdown of motor skills and low physical activity. It has been confirmed that regular practice of tai-chi reduced pain and joint stiffness, while increasing strength and flexibility and improving balance [39].

The comprehensive therapy described by Feng et al. (2015) also brings about positive results. It consists of physical training (two times a week for 90 minutes), daily supplementation with vitamins and micronutrients and psychotherapy. Individuals participating

in the therapy have increased strength in their lower limbs, walking speed and physical activity, as well as improved energy balance [40].

Diet

A proper diet is an essential factor in the prevention of the consequences of frailty syndrome [41]. The diet should be varied to avoid nutritional deficiencies. It is important to provide the appropriate amount of protein, whose recommended daily intake in the elderly is 1.2–1.5g/kg of body weight [42]. Leucine is an amino acid important for muscular tissue. It can be found in yellow cheese, beef, pork, veal, liver, salami, fish (tuna, sardines, halibut, mackerel, salmon, herring), as well as in soybeans, lentils, peas, beans, nuts (groundnuts, Italian, pistachio), pumpkin seeds, sesame seeds and sunflower [43]. The diet should also include whole grain wheat and large amounts of vegetables and fruits [42]. Products with antioxidant properties, which support the defence against muscle damage, are blue-violet fruits (chokeberries, currants, berries), vegetable oils, vegetables, red wine, tea and cocoa. Omega-3 acids are important components, as they act in a multidirectional manner, i.e. they potentially have anti-inflammatory properties, reduce the risk of cardiovascular diseases and cognitive impairment, as well as display anti-cancer qualities. Omega-3 acids are found in oily marine fish (halibut, salmon, mackerel, herring, sardines) and seafood (shrimp, lobster). As part of a proper diet, it is also important to eat foods rich in vitamin D, such as oily fish, margarine fortified with vitamin D, mushrooms, egg yolk and liver. [42,43]

Supplementation of vitamin D

Supplementation of vitamin D deficiency in the body is one of the elements preventing the development of frailty syndrome. Proper supplementation can increase muscle strength, reduce the risk of falls [20], fractures, premature deaths and improve the functional abilities of individuals at risk of frailty syndrome [44]. Under the influence of solar radiation, the human body produces vitamin D; however, this amount is very often insufficient [39]. The small amount of sun in the period from October to March in Central Europe contributes to vitamin D deficiency. Likewise, a diet deficient in vitamin D intensifies this deficiency [45], leading to osteopathy, osteoporosis and bone reconstruction disorders [39]. In people over 65 years of age, vitamin D supplementation is recommended at a dose of 800–2000 IU/day for an entire year [1]. Obese individuals, depending on the degree of obesity, should take 1600–4000 IU/day all year round. The normal level of vitamin D in the body is 30–50 ng/ml (75–125 nmol/l) [46]. Studies have shown that patients with vitamin D levels lower than 60 mmol/l have a reduced range of motion and move more slowly [47]. Supplementation has a positive effect on the nervous and muscular system, maintaining balance, muscle strength and reducing the risk of falls [1].

Prevention of frailty syndrome

Frailty syndrome requires multi-directional prophylaxis. Apart from physical activity, diet and supplementation with vitamin D, we should pay attention to the treatment of co-morbidities, control the number and type of medications, their side effects and interactions [1]. An important role in the prevention of frailty syndrome is played by vaccinations [8,48], which are one of the basic elements of infectious disease prophylaxis. In elderly patients, infectious diseases tend to be more severe and lead to organ damage; it is thus recommended to vaccinate them against influenza, pneumococci, hepatitis B, chickenpox, tetanus and shingles [48–50]. In the prevention of frailty syndrome in the elderly, it is also relevant to reduce or completely eliminate biological, socio-economic and environmental stressors [17,51].

In the reduction of frailty syndrome, multi-disciplinary actions should include the physical, psychological and socio-economic realm [8]. As studies show, the support and care of a family is of great importance in the prevention of disabilities and frailty syndrome [51].

Summary

Frailty syndrome is a dynamic process involving all body systems of the elderly. It increases the risk of falls and hospitalization, is a cause of deterioration of disability and the loss of independence, as well as promotes premature death. Therefore, at each stage of the disease, we should take measures appropriate to the health of the elderly. A key role in the prevention of frailty syndrome is played by physical exercise, diet and supplementation of deficiencies. These actions allow one to maintain proper functioning for the elderly and minimize the risk of frailty syndrome; in patients in the early stages of the disease, theses activities allow for the reversal of adverse changes in the body and for a full recovery. A proper approach to patients with frailty syndrome brings with it the chance to slow down the on-going process and to significantly reduce the risk of serious complications.

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ICT AND ENVIRONMENTAL SUPPORT FOR PATIENTS WITH FRAILTY SYNDROME: CAREWELL PROJECT*, FOCUS PROJECT** AND SUNFRAIL PROJECT***

WSPARCIE ICT I ŚRODOWISKOWE DLA PACJENTÓW Z ZESPOŁEM SŁABOŚCI: PROJEKT CAREWELL, PROJEKT FOCUS I PROJEKT SUNFRAIL

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A – przygotowanie projektu badania | study design, **B –** zbieranie danych | data collection, **C –** analiza statystyczna | statistical analysis, **D –** interpretacja danych | interpretation of data, **E –** przygotowanie maszynopisu | manuscript preparation, **F –** opracowanie piśmiennictwa | literature review, **G –** pozyskanie funduszy | sourcing of funding

SUMMARY

Maintaining wellbeing and independence by elderly people results from implementing the rules of "successful aging" , based on activity and participation in professional and social life, as well promotion of healthy lifestyle. Increasingly greater importance is attributed to frailty syndrome among patients of old age. These patients are characterized by increased sensitivity to stimuli, impaired ability to cope with inner and environmental stress-inducing factors, and they also have limited ability to maintain the state of physiological and psychosocial homeostasis. In such cases it is necessary to provide the patients with integrated care based on the support of the environment and the latest technology. Providing the residents of Lower Silesian Province with high quality of life, adjusting social services to residents' needs, and social integration alone are compliant with The Strategy of Social Integration in Lower Silesia. For that reason, supporting such patients with technology in Lower Silesia was started with the CareWell and WRP® pilot projects. The use of the latest technologies requires a social campaign, media-distributed information, and awakening social interest or even a trend related to their use. It will allow the refining of new services, reduce costs and improve safety for people. Instead of costly specialist care, elderly patients will receive individualized care located within the environment, which will be less costly but more intensive. The FOCUS project deals with reducing the frailty syndrome load in the population of elderly

people in Europe, taking note of enhancing the environmental support. The purpose of the SUNFRAIL project is to improve the identification, prevention and management of frailty, and care of multimorbidity by regional centers and institutions in EU countries of people aged 65 years and over living in the local community.

KEYWORDS: frailty, Carewell project, Focus project, SUNFRAIL project

STRESZCZENIE

Zachowania dobrostanu i samodzielności przez osoby starsze wynika z wdrażania zasad „dobrego starzenia się" opartego na aktywności i uczestnictwie w życiu zawodowym i społecznym oraz promocji zdrowego stylu życia. Coraz większe znaczenie przypisuje się rozpowszechnieniu zespołu słabości wśród pacjentów w wieku podeszłym. Pacjenci ci charakteryzują się zwiększoną wrażliwością na bodźce, upośledzoną zdolnością do radzenia sobie z wewnętrznymi i środowiskowymi czynnikami stresogennymi, a także posiadają ograniczoną zdolność do utrzymania stanu fizjologicznej i psychospołecznej homeostazy W takich przypadkach konieczne jest wsparcie pacjentów opieką zintegrowaną polegającą na wsparciu środowiska oraz najnowszej technologii. Zapewnienie mieszkańcom województwa dolnośląskiego wysokiej jakości życia, dopasowanie usług społecznych do potrzeb mieszkańców oraz sama integracja społeczna są zgodne ze Strategia Integracji Społecznej na Dolnym Śląsku. Dlatego też, na Dolnym Śląsku wsparcie takich pacjentów technologią, zostało zapoczątkowane pilotażem projektu CareWell i WRP®. Zastosowanie nowych technologii wymaga kampanii społecznej, informacji w mediach i wzbudzenia społecznego zaciekawienia, wręcz mody na ich stosowanie. Pozwoli to na doskonalenie nowych usług, obniżenie kosztów i poprawę bezpieczeństwa ludzi. W miejsce kosztownej opieki specjalistycznej pacjenci w wieku podeszłym uzyskują opiekę indywidualizowaną, lokowaną w środowisku, mniej kosztowną lecz bardziej intensywną. Projekt FOCUS zajmuje się zmniejszeniem obciążenia zespołem słabości w populacji osób w wieku podeszłym w Europie z uwzględnieniem wzmocnienia wsparcia środowiskowego. Celem projektu SUNFRAIL jest poprawa identyfikacji, zapobiegania i zarządzanie zespołem słabości oraz opieką nad wielochorobowością wśród osób po 65 roku życia mieszkających w społeczności lokalnej przez regionalne ośrodki i instytucje krajów UE.

SŁOWA KLUCZOWE: zespół słabości, projekt CareWell, projekt FOCUS, projekt SUNFRAIL

INTRODUCTION

The pace of aging of the population in Poland and around the world has accelerated rapidly: The number of people over the age of 65 was 261 million in 2004, and this figure will increase to 2 billion, by 2050. This demographic shift will require changes in the planning and delivery of health and social care. Two of the most problematic expressions of population ageing are frailty and multimorbidity.

Frailty Syndrome (FS, Frailty) is a common problem in both Polish and European society. The syndrome is described as a condition of the global loss of the body's physiological reserves, presenting multiple organ nature. This is evidenced by increased sensitivity to stimuli, impaired ability to cope with inner and environmental stress-inducing factors, and also limited ability to maintain the state of physiological and psychosocial homeostasis. It is estimated that frailty syndrome is present in 20–30% of the population of elderly people population above the age of 75, and it drastically increases with age. FS entails increased risk of many adverse health-related results, such as increased susceptibility to acute diseases, falls, disability, dependence on others, hospitalization, institutionalization (e.g. admission to healthcare centers), and increased mortality. However, it should be remembered that early, appropriately earlier implemented diagnostic and treatment proceedings may prevent frailty syndrome, and elderly people with FS at its early stage still have a chance to reverse the unfavorable process and return to the condition prior to FS. Multimorbidity, the simultaneous presence of two or more chronic diseases in a patient, is much more common in the elderly population.

Studies conducted over the last 20 years have progressively demonstrated the importance of the concurrence of multimorbidity and frailty. This poses new challenges to health services, in terms of skills, resources and organization. Examples of a comprehensive response to the increasing pace of society aging, and rise in the number of elderly people with frailty syndrome and multimorbidity are presented based on the Carewell Project, the FOCUS Project and the SUNFRAIL Project.

CAREWELL PROJECT - SUPPORTING ICT TECHNOLOGY

Frail patient care is an important part of health care, and this is why the CareWell pilot project has been launched in Lower Silesia [1,2]. A new model of integrated TeleCare has been developed with the help of new technology. In 2016, the Marshal's Office of the Lower Silesian Voivodeship co-financed the pilot of the innovative "Assisted Rescue Patient - WRP®" project, which successfully integrates into CareWell care. Assisted Rescue Patient - WRP® (hereinafter WRP®) consists in grouping, in one place, patient data and health needs. This project was launched by the Foun-

dation of the Autumn People in 2015 [3]. After intensive work on the system and its pilot, it is now ready to be implemented.

After the end of the CareWell pilot phase, the project will be continued in a more mature form for a much larger number of patients with complex social and health needs. Through the implementation of the abovementioned projects, telecare services will be available for CHF, COPD, diabetics, hypertension patients, etc., who are of poor health and require social support. The proposed ICT solution is fully in line with the 2020 Development Strategy for the Lower Silesian Voivodeship [3–5]. The health and safety of the inhabitants of Lower Silesia is a fundamental determinant of the quality of life in the region, as well as for the idea of technological support under the CareWell Project. Patients leaving the hospital who require further intensive care may be referred to the TeleCare CareWell system. The Electronic Case Record (ECR), made in the WRP® specific wrist band, will facilitate, for example, the rapid transfer of patient data to the CareWell system.

Brief description of the WRP Project

The WRP® wristband is a silicone electronic device designed according to the visualization (Figure 1).

Figure 1. Visualization of the WRP® device

Wristband device

The device is in the form of a stretchable band of varying sizes (diameters) based on the patient's wrist size. In the "watch" part, it has an embedded NFC tag - namely the NTAG216, with 924B of available memory [5]. This is a passive chip powered by a reading device, such as a smartphone or tablet. In the chip, basic patient identification data is recorded, as indicated in the illustration (Figure 2).

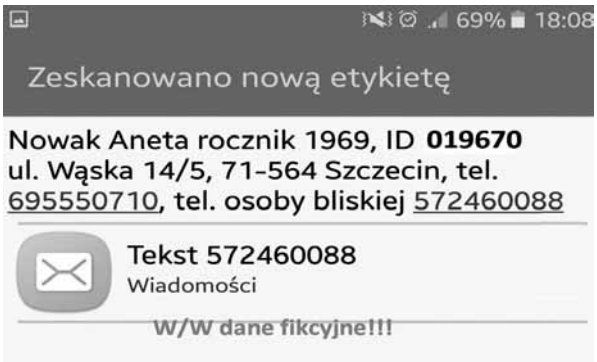

Figure 2. Sample patient data

The saved data makes it possible to immediately contact, with the touch of a smartphone or tablet screen (with NFC), the person assigned to them. The ID number encoded in the chip is identical to the number stamped on the outside of the band. The second integral part of the WRP® system is the Database (DB), stored on one of the best Polish servers - home.pl. The data saved therein is HTTPS and SSL protected. The Autumn People Foundation has the necessary DB encryption certificates. This means that the DB is just as safe as electronic banking and is additionally reported to GIODO. The idea of the DB is to provide it with free access to all healthcare services, such as emergency services, hospitals with a special focus on emergency and other medical units using TeleCare, as well as care homes or the police or fire department. The last two institutions would only have access to the master data, without the ability to view the medical data (sensitive). The advantage of such a system is the ability to define precisely, just at the time of receiving the dispatch by the emergency operator, to whom he sends the emergency team. It is enough that an accidental person reporting an accident with a WRP® participant will provide the operator, on his / her request, with the previously described ID number. It is not necessary for the 112 callers to have a smartphone with NFC. All they need is a regular cell phone and a request, from the operator, of ID from the band. WRP® is a simple, cost-effective and unprecedented system to save people's health and lives.

Database

The wristband device is one part of the WRP. Another integral part is the Database – DB, which is located on one of the best Polish servers - home.pl. The information stored therein is protected through HTTPS and SSL protocols. The Autumn People Foundation has the necessary certificates for DB encryption. This means the DB is as safe as, for example, electronic banking. The idea of the DB is to make it available for free to all life and health saving services, such as emergency medical services, hospitals – particularly emergency departments, other medical units, as well as, for example, care homes, police or the fire department. The latter two institutions would gain access only to basic data, without the possibility to review medical information (Figure 2).

Target groups

The main recipients of the new TeleCare services are those at risk of chronic diseases that result in health or life-threatening conditions, as well as those with implants and stimulators and those with physical and mental disabilities (e.g. heart disease, epilepsy, type I diabetes, Alzheimer, etc.). In addition, the recipients may be blind, deaf, deaf, visually impaired, children with at least basic identifying data from 3 to 10 years of age, as well as people of any age who wish to feel safer.

In the future of TeleCare services, there will be provided to the patients who were not included in the pilot

phase of the project. A similar educational approach will be required, as it was in the case of pilot group. The including criteria will be: chronically ill patients, requiring permanent medical care. Our ambition is to provide integrated care in our region for approx. 15,000 patients. Because of the complex criteria of inclusion or exclusion, this process will be implemented for over several years. Integrated care services are considered a key element of the Regional Health and Social Care Plan.

Compliance with the 2020 Development Strategy of the Lower Silesian Voivodship

The proposed ICT solution is fully in line with the Regional Health Strategy and with the technological support provided by the CareWell Project [4]. Those patients leaving the hospital who require further intensive care may be directed to the TeleCare CareWell system using this Electronic Case Record (ECR) designed to facilitate the safe transfer of patient data to the CareWell system. It is according to Priority of Health Protection 5.1.6 - Raising the level of personal, public and health safety including emergency - "The health and safety of the inhabitants of Lower Silesia are the basic determinants of the quality of life in the region" [3].

FOCUS PROJECT – ENVIRONMENTAL SUPPORT

The FOCUS Project (Frailty Management Optimization through EIP AHA Commitments and Utilization of Stakeholders input) is a project funded as a part of the 3rd Health Program. In Poland, the Department of Family Medicine at the Medical University in Wrocław is the Consortium's partner, with Universitat de Valencia (Spain) being the project coordinator. In addition, universities from the Netherlands, Great Britain, Italy and Portugal also participate in the project.

The aim of the project is to reduce frailty syndrome load in the population of elderly people in Europe, through partner support within the European Innovation Partnership for Active Healthy Aging (EIPAHA) consortium, with particular stress on the importance of early diagnostics and care provided for selected subpopulations in old age. The project is aimed at both developing the rules of proceedings in the clinical aspect (guidelines based on scientific evidence), and the social aspect, as well as to further specify the rules of support on the decision-maker and non-government organization (NGO) side.

The FOCUS project is divided into several stages and tasks provided to be completed:

- WP 1 – Project coordination - management of specific project stages and implementation of its results. WP1 tasks also include cooperation with other partners, providing the subject-related and financial safety of the project, as well as supervision over the timeliness of subsequent task performance. Developing periodic reports, including financial ones.
- WP 2 – Distribution of information about the project and its results - distribution of project results among target groups: patients with frailty syndrome and their carers, healthcare professionals, decision makers, representatives of NGOs, insurance companies, and organizations within EIPAHA.
- WP3 – Assessment of progress at subsequent project stages, and level of completed goals - this includes both internal assessment of correct subsequent project stage course, communication between partners of the performing team, as well as external assessment with the participation of target groups (patients with frailty syndrome and their carers, healthcare professionals, decision makers, representatives of NGOs, insurance companies, organizations within EIPAHA).
- WP4 – Synthesis of science and practical reality - determining the current state of knowledge and performed procedures regarding frailty syndrome within the European Union through the assessment of current literature publications, guidelines and implemented procedures related to frailty syndrome. Another stage includes determining need with regard to frailty syndrome on the part of patients and their carers, healthcare professionals, decision makers, NGO representatives, and insurance companies. Determining the recommendations which will be subjected to synthesis within WP5.
- WP5 – Analysis and development of guidelines – the identification, selection and validation of indicators used for analytical characterization and comparison between different interventions within studies on frailty syndrome as a part of EIPAHA. Analysis of data available as a part of EIPAHA, based on established indicators, as well as within cooperation with patients and their carers, healthcare professionals, decision makers, NGO representatives, and insurance companies. Determining the application possibilities in terms of guidelines developed as a consequence of WP4 realization, and clinical, as well as social predictors of their implementation.
- WP6 – Developing a network and platform of knowledge exchange, design and realization of the cooperation network. The final effect of this task will be to develop a platform of knowledge exchange containing the effects of prior project stages: data development, meta-analysis of literature, indicator groups, guidelines or resources for both patients and their carers, as well as healthcare professionals, decision makers, NGO representatives and insurance companies.

– WP7 – testing the guidelines - service verification, including testing the guidelines in terms of EIPAHA, conducted by the consortium's partners, taking note of feedback from patients and their carers, decision makers, NGO representatives and insurance companies. Estimating the monetary value of the implemented changes through economic analysis [6].

Interventions within WP 7 of the FOCUS project

The Department of Family Medicine at the Medical University in Wrocław is the partner as a part of WP 7. The task of MU in Wrocław will be to create new intervention groups for elderly people with frailty syndrome. Studies will be conducted in the areas of Opolskie and Lower Silesian provinces. The research project will be composed of three stages. In the first stage, the frailty syndrome problem will be presented to patients, and also elderly people (frail or pre-frail) will be qualified to another stage – intervention implementation. 3 intervention groups will be created: nutrition, physical activity, and a nutrition group with physical activity. The patients will perform simple tests of physical and mental efficiency, and measurements will also be taken. With nutrition advisor's help, nutritional recommendations will be prepared, dedicated to elderly people with frailty syndrome. The task of people participating in the studies in the nutrition group will be to improve their diet with products recommended in frailty syndrome, as well as modification of inappropriate nutrition habits. With a physiotherapy specialist's help, sets of exercises will be performed. The task of the study participants from the physical activity group will be to implement prepared training 2 times per week, after prior instructions. The first stage of the intervention will take 3 months, after which measurements and tests from stage 1 will be repeated. The second stage will take another 3 months, after which tests and measurements from the first stage will be repeated.

SUNFRAIL PROJECT – FRAILTY AND MULTIMORBIDITY

SUNFRAIL (SUNFRAIL Reference Sites Network for Prevention and Care of Frailty and Chronic Conditions in the EU) is a 30-month European project which began in May 2015. The project received funding from the EU Health Programme 2014–2020 and brings together 11 partners from six EU Member States, including Poland.

The purpose of the project is to improve the identification, prevention and management of frailty, and care of multimorbidity by regional centers and institutions in EU countries of people aged 65 years and over living in the local community.

These goals are achieved thus:

1. Developing an innovative, integrated model for prevention and management of frailty and care of multimorbidity through the main efficiency, effectiveness and sustainability criteria, and are based on the results of the EC Innovation Partnership on Active and Healthy Aging (EIP-AHA). The model will be multimodal, and the common core will facilitate scaling and adapting to the specificities of different healthcare systems and different socio-cultural contexts [7,8].
2. Validating the model on the basis of existing systems and services to address frailty and multimorbidity, as well as the patient's perceptions, and to express care needs and quality of life.
3. Evaluating the model's takeover / replication potential in various European organizational contexts, and determining the conditions for its sustainability and reproducibility.
4. Disseminating the results with a focus on the strategic decision makers at regional, national and EU levels to support the adoption of effective prevention and management procedures for frailty and care of multimorbidity.

The Polish partner of the SUNFRAIL project is the Department of Geriatrics, Medical University of Lodz. The Clinic's activities began in 2005, when the Department of Geriatrics was established. Currently the clinic provides hospital and ambulatory care for older patients, employs four physicians, two physiotherapists and four doctoral students. The main scientific and didactic activities of the Clinic address prophylactics, physical disability, the role of power and muscle strength in maintaining independence in daily functioning, nutritional status and well-being in the elderly. The Clinic also provides rehabilitation and physiotherapy, nursing and social support.

Research in the project

The experimental role played by the Polish center participating in the SUNFRAIL project involves knowledge exchange in the field of "good practice" to identify, prevent, and treat multimorbidity, focusing particularly on the prevention and avoidance of hospitalization.

The second important study is the development, validation and testing of the SUNFRAIL Tool for early detection of frailty through the assessment of physical, cognitive, nutritional and psychosocial risk of dysfunction as well as support for the adoption of care pathways [9].

The goal of the experiment is to improve professional procedures by applying a multidisciplinary approach using specific tools. The SUNFRAIL TOOL questionnaire has been validated in terms of comprehensibility and is currently available in five languages: English, Polish, French, Spanish and German. An initial assessment of the applicability of this approach has also been made by representatives of different back-

grounds. Co-operation with the EIP-AHA network, as well as the European Union Geriatric Medicine Society (EUGMS) – a group associated with "Frailty in older persons", assures scientific support for these newly developed tools and strengthens its international value [8].

CONCLUSIONS

The technology making use of ICT solution is beginning to significantly support patients with frailty syndrome in everyday life, improving the standard of their lives. The fact that pilot results clearly indicate a decrease in the GDS index for patients in the intervention group provides encouragement to implement CareWell and WRP® services, and analysis of user satisfaction shows that people participating in the projects are satisfied and would like to continue using new services and new solutions. On the other hand, WRP® is a simple, very inexpensive system, and yet it still provides unprecedented possibilities for saving human health and life. Of course, the implementation of new technologies requires a social campaign, media-distributed information, and awakening social interest or even a trend related to their use. Awakening this social interest would provide a snowball effect. Whisper marketing would appear, Internet forum boards would be created, and simultaneously sponsors would join the social campaign. All of this will allow the refining of new services, cut costs, and improve human safety, in order to simply provide them with a product. In order to make them feel safer.

The FOCUS and SUNFRAIL projects will facilitate multi-aspect (preventive, diagnostic, treatment, sociological, economic) use of obtained knowledge about frailty syndrome and multimorbidity. The results of the studies will constitute a valuable source of information in the process of developing an identification system for patients with frailty syndrome, rules of cooperations between multi-speciality teams, educational programs for patients and their carers, as well as healthcare and social care professionals. The results of these studies will also constitute a valuable source of information in the development of tools for the evaluation of care quality in the case of patients with frailty syndrome, with analysis of their needs and expectations in relation to somatic, mental, and social fields.

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   – 21st century heart solution may have a sting in the tail. BMJ 2002; 325(7357): 184.
c) Electronic journal/WWW page
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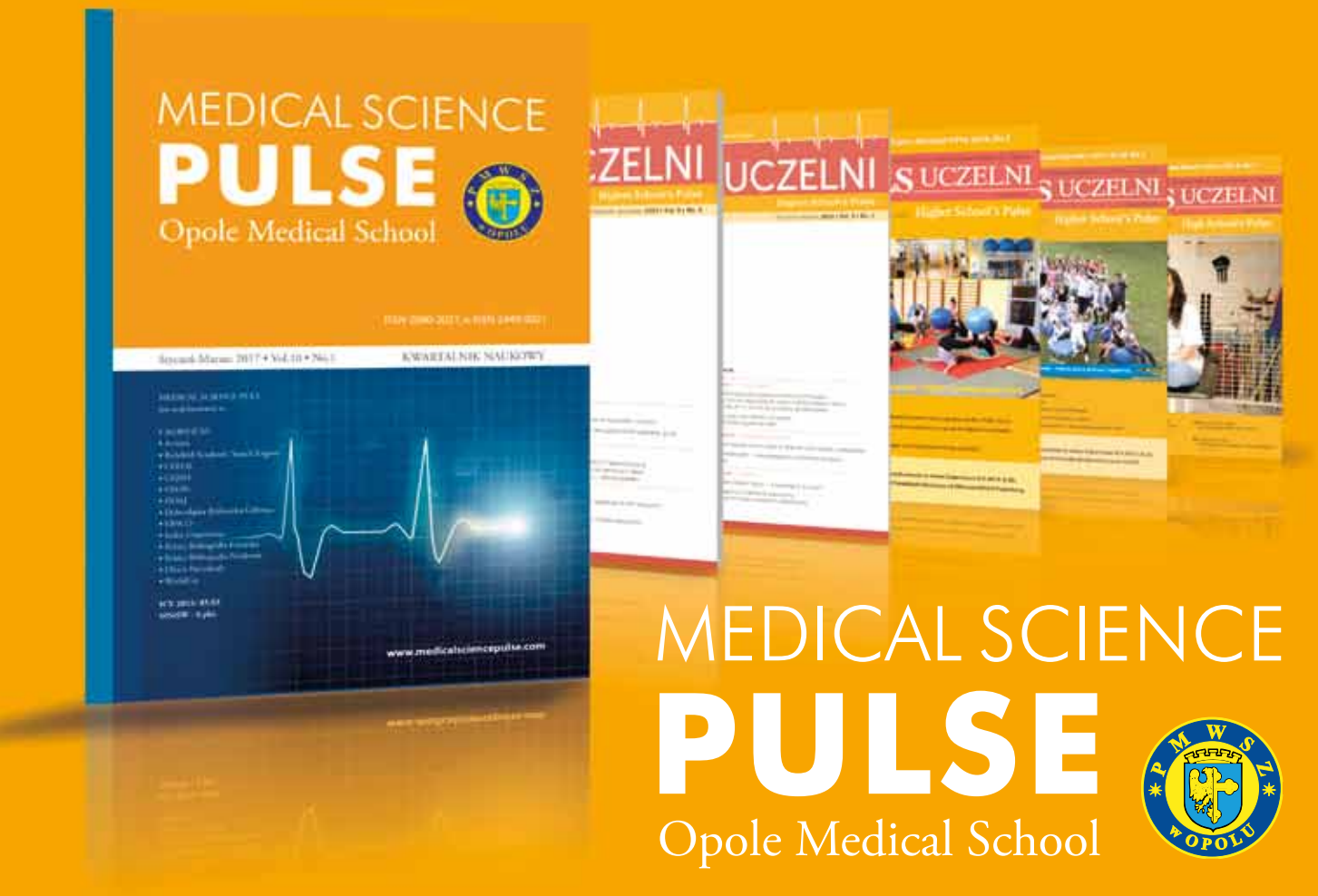

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