

Vol. 15 No. 4 2020
ISSN 1336-9326 print
e-ISSN 2644-5433

ZDRAVOTNÍCTVO A SOCIÁLNÁ PRÁCA ZDRAVOTNICTVÍ A SOCIÁLNÍ PRÁCE

HEALTH AND SOCIAL WORK

Medzinárodný vedecký časopis zdravotníctva,
ošetrovateľstva, laboratórnych a vyšetrovacích
metód, pedagogiky a sociálnej práce

*International scientific journal of Health, Nursing,
Laboratory Medicine, Education and Social Work*

Editor: prof. MUDr. Miron Šramka, DrSc.



www.zdravotnictvoasocialnapraca.sk
www.zdravotnictviasocialni prace.cz



Vydavateľstvo Slovenská republika
SAMOSATO, s.r.o., Bratislava
Vydavatel'stvo Česká republika
Maurea, s.r.o., Plzeň



administratívne centrum

AIRCRAFT

AIRCRAFT administratívne centrum je situované v rozvíjajúcej sa administratívno-obchodnej zóne pri nákupnom centre AVION a letisku M.R.Štefánika, na Ivánskej ceste 30/B.

kancelárske priestory od 40m²

najväčšia jednotka 620m²

kancelársky štandard A

reštaurácia a konferenčné miestnosti v budove

celkovo 10 000 m² kancelárskych priestorov

AIRCRAFT DIAGOSTIK COMPANY s.r.o.

Ivánska cesta 30/B, 821 04 Bratislava

Tel.: +421 2 32 55 31 46, +421 911 211 612

struhar@afl.sk

www.aircraftoffice.sk



aircraftsporthouse

Aircraft Sport House je špičkové fitness centrum, ktoré sa nachádza na ploche 3000 m². Jednou z najväčších výhod fitness centra je jeho rozloha. Keď raz prídete k nám, všetky ostatné fitness centrá sa Vám budú zdať malé. K fitness centru patrí aj bar, kde si môžete dať kávu alebo pred-tréningový shake. Medzi iné vybavenie v našom fitness centre patria spinningové bicykle, hrubé Watson tyče, kettlebells, strongman zóna so štedrým strongman vybavením, vzpieračské pódia a silové kletky.

Bojové športy
Rehabilitácie
Strongman
Craft camp
Wellness

Box club
Riddim Dance
Dance Station
Aerobik
Pilates

Aircraft Sport House s.r.o.

Ivánska cesta 30/D, 821 04 Bratislava

Fitness +412 944 645 101 - Halové športy +421 949 422 051

sporthouse@afl.sk - www.aircraftsport.sk

PARTNERY:



ZDRAVOTNÍCTVO A SOCIÁLNA PRÁCA
ZDRAVOTNICTVÍ A SOCIÁLNÍ PRÁCE

**Časopis zdravotníctva, ošetrovateľstva,
laboratórnych vyšetrovacích metód,
pedagogiky a sociálnej práce**

Medzinárodný vedecký časopis Vysokkej školy
zdravotníctva a sociálnej práce sv. Alžbety, n.o.,
v Bratislave

HEALTH AND SOCIAL WORK

**Journal of Health, Nursing, Laboratory
Medicine, Education and Social Work**

International Scientific Journal St. Elizabeth
University of Health and Social Work Bratislava

Publisher / Vydáva: SAMOSATO, s.r.o., Bratislava, SR a MAUREA, s.r.o., Plzeň, ČR

Editor: prof. MUDr. Miron Šramka, DrSc.
Co-editor: doc. PharmDr. Pavol Beňo, CSc.
Redakcia: prof. MUDr. Miron Šramka, DrSc. (šéfredaktor)
doc. PharmDr. Pavol Beňo, CSc. (tajomník redakcie)
PhDr. Ing. Martin Samohýl, PhD. (výkonný redaktor)
Mgr. et Mgr. Silvia Capíková, PhD. (odborný redaktor)
PhDr. Zoja Csoková, PhD. (technický redaktor)

Editorial Board / Redakčná rada:

doc. PharmDr. Pavol Beňo, CSc. (Trnava, Slovakia)
prof. PhDr. Anna Bérešová, PhD. (Košice, Slovakia)
doc. PhDr. Jana Boroňová, PhD. (Trnava, Slovakia)
doc. PhDr. Lucia Cintulová, PhD. (Bratislava, Slovakia)
prof. PhDr. Pavol Dancák, PhD. (Prešov, Slovakia)
doc. PhDr. Lucia Dimunová, PhD. (Košice, Slovakia)
prof. MUDr. Štefan Durdík, PhD. (Bratislava, Slovakia)
prof. MUDr. Peter Fedor-Freybergh, DrSc. (Bratislava)
prof. MUDr. et PhDr. et Mgr. Alena Furdová, PhD., MPH,
MSc. (Bratislava, Slovakia)
prof. MUDr. Štefan Galbavý, DrSc., Dr.h.c. (Bratislava,
Slovakia)
prof. MUDr. Anton Gúth, CSc. (Bratislava, Slovakia)
MUDr. Mikuláš A. Haľko (New York, USA)
prof. MUDr. Štefan Hrušovský, CSc., Dr SVS (Bratislava)
prof. MUDr. Peter Juriš, CSc. (Košice, Slovakia)
prof. PhDr. Dagmar Kalátová, PhD. (Příbram,
Czech republic)
prof. PhDr. Mária Kilíková, PhD. (Rožňava, Slovakia)
doc. Dr. Andrzej Knapik, PhD. (Katowice, Poland)

Univ.prof. PhDr. Vlastimil Kozon, PhD. (Wien, Austria)
prof. MUDr. Vladimír Krčméry, DrSc., Dr.h.c.mult.
(Bratislava, Slovakia)
doc. MUDr. Ján Mašán, PhD. (Trnava, Slovakia)
doc. PaedDr. Ilona Mauritzová, PhD. (Plzeň, Czech rep.)
doc. PhDr. Eva Naništová, CSc., (Bratislava, Slovakia)
doc. PhDr. Jitka Němcová, PhD. (Praha, Czech republic)
prof. PhDr. Michal Oláh, PhD. (Bratislava, Slovakia)
doc. RNDr. Eugen Ružický, CSc. (Bratislava, Slovakia)
prof. MUDr. Anna Sabová, PhD. (Novi Sad, Serbia)
prof. PhDr. Milan Schavel, PhD. (Bratislava, Slovakia)
prof. MUDr. Jaroslav Slaný, PhD. (Trnava, Slovakia)
doc. MUDr. Jana Slobodníková, CSc., m.prof. (Trenčín,
Slovenská republika)
prof. MUDr. Peter Šimko, PhD. (Bratislava, Slovakia)
prof. MUDr. Miron Šramka, DrSc. (Bratislava, Slovakia)
prof. MUDr. Igor Šulla, DrSc. (Košice, Slovakia)
prof. MUDr. Zdenko Tomić, PhD. (Novi Sad, Serbia)
prof. PhDr. Valerie Tóthová, PhD. (České Budejovice, Czech
republic)

Journal is indexed in / Časopis je indexovaný v databázach:

CEEOL, Bibliographia Medica Slovaca (BMS) a zaradený do citačnej databázy CiBaMed
Časopis je recenzovaný. Za obsahovú a formálnu stránku zodpovedajú autori. Texty neprešli jazykovou korektúrou.
Pretlač je dovolená s písomným súhlasom redakcie. Nevyžiadané rukopisy sa nevracajú.
EV 4111/10, Zaregistrované MK SR pod číslom 3575/2006 • Zaregistrované MK ČR pod číslom E 19259 •
ISSN 1336-9326 print • e-ISSN 2644-5433 • 4 vydania ročne • Nepredajné
Zdravotníctvo a sociálna práca • Volume / Ročník 15, Number / Číslo 4, 2020. Vyšlo dňa 15.09.2020.
Link na online verziu časopisu: www.zdravotnictvoasocialnapraca.sk; www.zdravotnictviasocialniprace.cz

Adresa redakcie

Časopis Zdravotníctvo a sociálna práca,
Klinika stereotaktickej rádio-chirurgie,
OÚSA, SZU a VŠZaSP sv. Alžbety,
Heydukova 10, 812 50 Bratislava,
Slovenská republika. číslo účtu:
2925860335/1100. SR. Adresa
redakcie pre zaslanie rukopisov:
e-mail: msramka@ousa.sk

Vydavateľstvo SR

SAMOSATO, s.r.o.,
Plachého 53
P.O.BOX 27
840 42 Bratislava 42,
Slovenská republika
IČO: 35971509
IČ DPH:
SK 202210756

**Vydavatelství
ČR**

Maurea, s.r.o.,
ul. Edvarda
Beneše 56
301 00 Plzeň
Česká republika
IČO: 25202294

Objednávky pre SR a ČR

doc. PharmDr. Pavol Beňo, CSc.,
Fakulta zdravotníctva a sociálnej
práce Trnavskej univerzity
v Trnave, Univerzitné nám. 1,
918 43 Trnava
Tel: 00421911747282
e-mail: msramka@ousa.sk
číslo účtu: 2925860335/1100 SR

Reviewers / Recenzenti

doc. PharmDr. **Pavol Beňo**, CSc.
Fakulta zdravotníctva a sociálnej práce,
Trnavská univerzita v Trnave, Trnava,
Slovenská republika

prof. PhDr. **Anna Bérešová**, PhD.
Lekárska fakulta, Univerzita Pavla Jozefa
Šafárika v Košiciach, Košice, Slovenská
republika

doc. PhDr. **Jana Boroňová**, PhD.
Fakulta zdravotníctva a sociálnej práce,
Trnavská univerzita v Trnave, Trnava,
Slovenská republika

doc. PhDr. **Lucia Ludvig Cintulová**, PhD.
Vysoká škola zdravotníctva a sociálnej práce
sv. Alžbety, Bratislava, Nové Zámky,
Slovenská republika

prof. PhDr. **Pavol Dancák**, PhD.
Gréckokatolícka teologická fakulta,
Prešovská univerzita v Prešove, Prešov,
Slovenská republika

doc. PhDr. **Lucia Dimunová**, PhD.
Lekárska fakulta, Univerzita Pavla Jozefa
Šafárika v Košiciach, Košice, Slovenská
republika

prof. MUDr. **Štefan Durdík**, PhD.
Klinika onkologickej chirurgie LFUK
a OÚSA, Lekárska fakulta, Univerzita
Komenského, Bratislava, Slovenská
republika

prof. MUDr. **Peter Fedor-Freybergh**,
DrSc.
Ústav prenatalnej a perinatálnej
psychológie, medicíny a sociálnych vied,
Vysoká škola zdravotníctva a sociálnej práce
sv. Alžbety, Bratislava, Slovenská republika

prof. MUDr. et PhDr. et Mgr. **Alena
Furdová**, PhD., MPH, MSc.
Klinika oftalmológie LF UK a Univerzitná
nemocnica Bratislava, Lekárska fakulta,
Univerzita Komenského, Bratislava,
Slovenská republika

prof. MUDr. **Štefan Galbavý**, DrSc., Dr.h.c.
Ústav súdneho lekárstva LF UK, Lekárska
fakulta, Univerzita Komenského, Bratislava,
Slovenská republika

Univerzita sv. Cyrila a Metoda v Trnave,
Trnava, Slovenská republika
prof. MUDr. **Anton Gúth**, CSc.
Klinika fyzikálnej, balneológie a liečebnej
rehabilitácie SZU a UNB, Slovenská
zdravotnícka univerzita, Bratislava,
Slovenská republika

MUDr. **Mikuláš A. Haľko**
(New York, USA)

prof. MUDr. **Štefan Hrušovský**, CSc., Dr
SVS
Ústav zdravotníckych disciplín, Vysoká
škola zdravotníctva a sociálnej práce sv.
Alžbety, Bratislava, Slovenská republika

prof. MUDr. **Peter Juriš**, CSc.
Lekárska fakulta, Pavla Jozefa Šafárika v
Košiciach, Košice, Slovenská republika

prof. PhDr. **Dagmar Kalátová**, PhD,
Ústav sv. Jana N. Neumanna, Vysoká škola
zdravotníctva a sociálnej práce sv. Alžbety,
Příbram, Česká republika

prof. PhDr. **Mária Kilíková**, PhD.
Detašované pracovisko bl. Sáro
Salkaháziovej Kósu Schoppera, Vysoká
škola zdravotníctva a sociálnej práce sv.
Alžbety, Rožňava, Slovenská republika

doc. PhDr. **Nadežda Kovalčíková**, PhD.
Fakulta zdravotníctva a sociálnej práce,
Trnavská univerzita v Trnave, Trnava,
Slovenská republika

Univ.prof. PhDr. **Vlastimil Kozoň**, PhD.
(Wien)
Allgemeines Krankenhaus – Medizinischer
Universitätscampus Direktion des Pflege-
dienstes POE Bereich klinische Pflege-
wissenschaft, Währinger Gurtel, Austria

prof. MUDr. **Vladimír Krčméry**, DrSc,
Dr.h.c.mult.
Vysoká škola zdravotníctva a sociálnej práce
sv. Alžbety, Bratislava, Slovenská republika

doc. PhDr. **Eva Naništová**, CSc.
Fakulta psychológie, Paneurópska vysoká
škola, Bratislava, Slovenská republika

doc. MUDr. **Ján Mašán**, PhD.
Univerzita sv. Cyrila a Metoda, Trnava,
Slovenská republika

doc. PaedDr. **Iлона Mauritzová**, PhD.
Fakulta zdravotníckych štúdií, Západočeská
univerzita v Plzni, Plzeň,
Česká republika

prof. PhDr. **Michal Oláh**, PhD.
Vysoká škola zdravotníctva a sociálnej práce
sv. Alžbety, Bratislava, Slovenská republika

doc. RNDr. **Eugen Ružický**, CSc.
Fakulta informatiky, Paneurópska vysoká
škola, Bratislava, Slovenská republika

prof. MUDr. **Anna Sabová**, PhD.,
Inštitút Martina Luthera, Vysoká škola
zdravotníctva a sociálnej práce sv. Alžbety,
Bc. Petrovec, Nový Sad, Srbsko

PhDr. Ing. **Martin Samohýl**, PhD.
Lekárska fakulta Univerzity Komenského,
Bratislava, Slovenská republika

prof. PhDr. **Milan Schavel**, PhD.,
Vysoká škola zdravotníctva a sociálnej práce
sv. Alžbety, Bratislava, Slovenská republika

prof. MUDr. **Jaroslav Slaný**, PhD.
Fakulta zdravotníctva a sociálnej práce,
Trnavská univerzita v Trnave, Trnava,
Slovenská republika

doc. MUDr. **Jana Slobodníková**, CSc.,
m.prof.
Fakulta zdravotníctva, Trenčianska
univerzita Alexandra Dubčeka v Trenčíne,
Trenčín, Slovenská republika

prof. MUDr. **Peter Šimko**, PhD.
Lekárska fakulta, Slovenská zdravotnícka
univerzita v Bratislave, Bratislava,
Slovenská republika

prof. MUDr. **Miron Šramka**, DrSc.
Vysoká škola zdravotníctva a sociálnej práce
sv. Alžbety, Bratislava, Slovenská republika

prof. MUDr. **Igor Šulla**, DrSc.
Univerzita veterinárskeho lekárstva a
farmácie v Košiciach, Košice, Slovenská
republika

prof. PhDr. **Valerie Tóthová**, PhD.
Zdravotné sociální fakulta, Jihočeská
univerzita v Českých Budějovicích, České
Budějovice, Česká republika

CONTENT / OBSAH

Health / Zdravotníctvo

Factors Affecting the Quality of Life in Patients with First Type Diabetes Mellitus 151

Faktory ovlivňující kvalitu života u pacientů s diabetem mellitem 1. typu

Kateřina Křepelová, Ondřej Lešetický, Ingrid Baloun,

Aneta Witzanyová, Miloš Velemínský Sr

Sebaceous Carcinoma of the Eyelids 163

Sebaceózný karcinóm mihalníc

Eva Svoradová, Juraj Sekáč, Pavol Kusenda, Pavel Babál

Different Anti_VEGF Agents fort he Treatment of Diabetic Macular 168

Edema in Patients with Worse Baseline Visual Acuity – Real World Evidence

Rôzne anti-VEGF preparáty pri liečbe diabetického edému makuly

u pacientov s horšou vstupnou ostrôťou zraku – dôkaz z reálnej klinickej praxe

Pavol Kusenda

Case Study of the Application of Hippotherapy 174

in School-Age Children with Multiple Disabilities

Případová studie aplikace hipoterapie u pacientů

předškolního věku s kombinovaným postižením

Kristýna Miškovská, Markéta Janatová, Kateřina Čapková, Martin Vítězník

Application of the Method of Short Intervention 179

to Increase the Health Literacy of Patients in the Czech Republic

Aplikace metody krátké intervence pro zlepšení zdravotní

gramotnosti pacientů ve zdravotnických zařízeních v České republice

Dagmar Škochová, Jitka Němcová

Parental influence on the physical activity of adolescents: 186

systematic review of current scientific evidence

Vplyv rodičov na fyzickú aktivitu adolescentov:

Systematický prehľad súčasného stavu vedeckého poznania

Michaela Kostíčová, Eva Dobíášová, Jaroslava Kopčáková

Social Work / Sociálna práca

Limits and Possibilities of Management of Social Services 195

Related to the Performance of Certain Professional Activities

Limity a možnosti manažmentu sociálnych služieb

spojených s výkonom niektorých odborných činností

Marcel Tóth

EDITORIAL

Dear Readers,

The journal Zdravotníctvo a sociálna práca (*Health and Social Work*) was established in 2006 at Faculty of Health and Social Work of blessed P.P. Gojdič in Prešov, St. Elizabeth University College of Health and Social Work in Bratislava. In 2019, the 14th year of the journal was published.

Previously professional journal, within 5 years developed into an international, peer-reviewed scholarly journal, published quarterly (4 issues per year). The journal is published by the St. Elizabeth University of Health and Social Work in Bratislava. The journal became international in 2009. The journal is published and distributed in the Slovak Republic and also in the Czech republic.

Since 2011, the journal is published both in print and as electronic issues, available from: www.zdravotnictvoasocialnapraca.sk and www.zdravotnictviasocialniprace.cz. Starting by issue No. 3 in 2014, the scope of the journal has broaden and the journal is covering health sciences, such as Public Health, Nursing, Laboratory Medicine, but also helping professions such as Social Work or Pedagogy. Collaboration with Faculty of Health and Social Work of Trnava University in Trnava was initiated. The journal is indexed in the following databases: Central and Eastern European Online Library – CEEOL (since 2018), Bibliographia Medica Slovaca (BMS), and Slovak reference database CiBaMed.

The part of journal is Supplementum, to publish abstracts from international conferences organized by the St. Elizabeth University of Health and Social Work in Bratislava. In 2020, the conference was planned, similarly to last year, in Ustroń, Poland. Due to the unfavorable epidemiological situation, the conference was postponed by the organizers to March next year.

Our long-term effort is to gradually acquire for the journal Central European significance and be included in international databases. Starting by issue No. 4 in 2016, the journal accepted the Harvard style of referencing, and changed guidelines for the authors. The aim of the changes was to move closer to the standard in international journals published in English in the area of health and helping professions. The editors are aspiring for registration in other relevant international databases, the journal is moving this year from issue 3 to the publication of articles in English only. The journal will be renamed next year.

Prof. Miron Šramka, MD, DSc.
Redactor in Chief

**FACTORS AFFECTING THE QUALITY OF LIFE IN PATIENTS
WITH FIRST TYPE DIABETES MELLITUS**
**FAKTORY OVLIVŇUJÍCÍ KVALITU ŽIVOTA U PACIENTŮ
S DIABETEM MELLITEM I. TYPU**

Kateřina KŘEPELOVÁ,¹ Ondřej LEŠETICKÝ,¹ Ingrid BALOUN,²
Aneta WITZANYOVÁ,² Miloš VELEMÍNSKÝ Sr²

¹ Faculty of Management, University of Economics in Prague

² Institute of Physiotherapy and Selected Medical Disciplines

(Faculty of Social Studies, University of South Bohemia in České Budějovice,
J. Boreckého 1167/27, 370 11 České Budějovice)

Contact address: Mgr. Ingrid Baloun (Institute of Physiotherapy and Selected Medical Disciplines, Faculty of Social Studies, University of South Bohemia in České Budějovice, J. Boreckého 1167/27, 370 11 České Budějovice), The address: Klenovice 269, 39201 Klenovice, Czech Republic; e-mail: Ingrid.baloun@gmail.com

ABSTRACT Introduction and aims: First type diabetes mellitus (T1DM) is a chronic autoimmune disease. In accordance with contemporary estimates, about 3 500 children suffer from it in the Czech Republic. Statistical data indicate that one in two thousand children become ill with T1DM. The adolescence is considered as the most complicated development period in the life of an individual. Its diagnosis and therapy call for a discipline including the compliance and self-monitoring. This requirement falls outside the scope of the medical control and thus, the pediatric medical care puts ever growing emphasis on the evaluation of the Health-Related Quality of Life (HRQOL). The aim of the work was to determine the degree of specific HRQOL and general QOL as reported by adolescent first type diabetics aged 13–18 years, their parents and children from a control group in the Czech Republic.

Materials and methodology: Following that in methodology, the results were compared, factors affecting HRQOL and QOL were identified and effects of the disease on the family as a whole were examined. PedsQL was used as a tool – module 3.0 diabetes, 4.0 general QOL and 2.0 effects of the disease on the family.

Results and discussion: The results demonstrated that the children reported higher specific HRQOL as well as general QOL compared to their parents. In adolescents, the specific HRQOL is most affected by the area of diabetes symptoms. Results of PedsQL module 2.0 suggest that diabetes can negatively affect the peace of mind in parents and is associated with considerable fear.

Conclusions: The main benefit of the research lies in the results, which provide valuable insight into the quality of life of children and adolescents with type 1 diabetes mellitus.

Key words: Diabetes mellitus –adolescent- Quality of Life HRQOL- PedsQL

ABSTRAKT Úvod a cíle: Diabetes mellitus 1. typu (T1DM) je chronické autoimunitní onemocnění, kterým dle odhadů v ČR současně trpí přibližně 3 500 dětí. Statistiky ukazují, že T1DM onemocní 1 z 2 000 dětí. Dospívání je označováno za nejsložitější vývojové období v životě jedince. Diagnóza a její léčba vyžaduje disciplínu zahrnující compliance a selfmonitoring. Přesahuje tak lékařskou kontrolu, proto pediatrická lékařská praxe klade stále větší důraz na hodnocení kvality života související se zdravím (HRQOL). Cílem práce proto bylo zjistit jakou míru specifické HRQOL a obecné QOL hlásí dospívající diabetici 1. typu ve věku 13–18 let, jejich rodiče a děti z kontrolní skupiny v ČR.

Materiál a metodika: Metodologicky následovalo srovnání výsledků a zjištění faktorů ovlivňujících HRQOL a QOL a zkoumání vlivu onemocnění na rodinu jako celek. Jako

nástroj měření byl použit PedsQL – modul 3.0 diabetes, 4.0 obecná QOL a 2.0 vliv onemocnění na rodinu.

Výsledky a diskuze: Výsledky ukázaly, že děti hlásí vyšší specifickou HRQOL i obecnou QOL ve srovnání s rodiči. Specifickou HRQOL u dospívajících nejvíce ovlivňuje oblast symptomů diabetu. Výsledky modulu 2.0 PedsQL naznačují, že diabetes může mít negativní dopad na psychickou pohodu rodičů a je spojen s vysokou mírou obav.

Závěr: Hlavní přínos výzkumu spočívá ve výsledcích, které přinášejí cenný náhled na kvalitu života dětí a dospívajících s diabetem mellitem 1. typu

Klíčová slova: Diabethes mellitus - PedsQL – Kvalita života - adolescenti

INTRODUCTION AND AIMS

First type diabetes mellitus

Diabetology is an important field, as shown by the analysis of costs and volume of care. Data indicate that a diabetic patient is more costly compared to the average patient treated with another diagnosis. The dependence of costs on the occurrence of diabetic complications is also vital.

Diabetology undoubtedly affects the cost of the health system as a whole. Costs can fundamentally affect patient compliance and improving the organization of care.

Improving the quality of care does not only affect the costs of the health system, but most importantly, it is the effect it has on patients. The growing importance that insurance companies have begun to attach to the economics of pharmacology is among the other economic benefits. This documents the development of the Czech pharmaceutical market (Horák 2009).

Doctors have seen an increase in childhood diabetes in recent years. The disease manifests in 200-300 children a year in the Czech Republic. The relatively complex treatment of chronic autoimmune disease imposes a burden on the child as well as the whole family. Constant discipline and self-monitoring are required. Failure to follow strict daily routine regimens - blood glucose measurements, insulin dosing, diet and exercise - can lead to health complications that might be severe. In addition to the fact that acute and late complications significantly reduce the quality of life and increase mortality, the problem associated with the increase in the number of patients is also the growth in complications, and thus the economic side - financing the treatment of these subsequent complications (Kudlová 2015; Pelikánová, Bartoš 2011). The disease affects all areas of the child's life and the lives of the whole family, including functioning at school (Dítě s diabetem..., © 2015).

Diabetes mellitus - first type was also called juvenile diabetes. It is an autoimmune disease that often manifests in childhood or adolescence (Lebl *et al.* 2016). It is the second most common chronic disease of children in developed countries. Due

to the autoimmune reaction of the organism, even the organism of a very small or young individual loses the ability to produce insulin (Karen, Svačina 2014). Children and young adolescents thus become lifelong dependent on the administration of insulin by artificial means (Perušičová 2014a). In a healthy young person, the blood glucose does not fall below 3.3 mmol /L and does not rise above 5.6 mmol /L on an empty stomach. Blood glucose levels rise sharply to 30 mmol /L or more if the diabetics are without an insulin intake (Dítě s diabetem..., © 2015). Insufficient production or effectiveness of insulin is mainly associated with a disorder of carbohydrate metabolism, but also problems with the metabolism of fats, proteins and minerals (Lebl *et al.* 2016). The causes of why the immune system starts destroying its own cells for no apparent reason are not entirely clear (Brož 2012).

Life with diabetes mellitus

The treatment of type 1 diabetes is also associated with the sudden onset of serious complications. Unfortunately, these acute complications often affect diabetics. Childhood and adolescence both bring constant changes and complications related to them. (Kudlová 2015).

Therefore, frequent self-monitoring of blood glucose is necessary throughout childhood and adolescence and education is emphasized. Other complications are late complications, which develop in every diabetic, even well-controlled (Šafránková, Nejedlá 2006). They arise as a result of the long-term effects of hyperglycemic states on the body or changes caused by metabolic abnormalities. These chronic complications significantly reduce the quality of life and increase mortality (Kudlová 2015). In addition, children with type 1 diabetes mellitus are more often at risk of so-called associated autoimmune diseases. These can appear when diabetes is detected, but also at any time during life. This might be one of the reasons why pediatric patients are generally hospitalized more often (Pelikánová, Bartoš 2011; Edelsberger 2009). Caring for a diabetic child can definitely be described as much more demanding than in the case of a healthy child. Diabetes is a burden for both parents and

children, and like any disease, it is reflected in the quality of life of the whole family. According to Lebl *et al.* (2016), the upbringing of a diabetic - adolescent is described as one of the most difficult - from the parent's point of view.

Quality of life

"Quality of life refers to individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." (The WHOQOL Group, p. 1). If the quality of life of children and adolescents is to be examined, it is necessary to be aware of their differences from adults (Mareš *et al.* 2006). Diabetes is not frequently at the top of the list of adolescent priorities (Lebl *et al.* 2016). A significant indicator of the quality of life in children with diabetes is the duration of the disease (Burešová *et al.* 2008).

As part of the application of a holistic approach to treatment, pediatric medical practice places increasing emphasis on the inclusion of HRQOL assessments in patients with a specific disease, such as type 1 diabetes.

AIM OF THE RESEARCH

The research aims to evaluate the level of the specific and general quality of life of respondents and their parents in adolescents aged 13-18 years suffering from type 1 diabetes mellitus. Furthermore, it aims to compare the quality of life of children with DM with a control group of "healthy children". The article also aims to evaluate the core dimensions of the general and specific quality of life, which is also related to the impact of a lifelong chronic disease on the family.

METHODOLOGY

The research sample consisted of patients aged 13–18 years. Children aged 13–15 are so-called "pubescents", and from 15–18 years, they are adolescents (Říčan 2014). There were several reasons for choosing this sample of respondents. The 12th year of life has long been described as the most common period of disease manifestation, which is often accompanied by ketoacidosis (Pelikánová, Bartoš 2011). It is primarily a period of life, which is often referred to as the most complex, most enthralling, or most dramatic developmental stage in an individual's life. Additionally, it is the fact that children at this age are already able to evaluate the questions themselves and form their own opinions. Of course, the interview could only take place with the consent of the parents. Therefore, it is a period of childhood and adolescence, but due to the diagnosis, these children are subject to demands, especially strict adherence to the treatment

regime. We should always be aware that this is a child patient, not an adult one.

Characteristics of research

For the purpose of conducting the research, the sample size of the respondents was determined to be 44 diabetics, 39 parents, and 41 children not suffering from type 1 diabetes in the control group. The size of the sample was determined according to the central limit theorem, which states: "The size of the sample for calculating the mean should not be less than 30 in the case of a probability distribution similar to normal and less than 100" (Mathematical biology 2020).

The research sample of adolescents with diabetes consisted of 44 children - 26 boys, i.e. 59.09% and 18 girls, i.e. 40, 91%. There were 39 parents. The average age of the interviewed adolescent patients aged 13–18 years was 15.43 years, as shown in Table 1, where descriptive statistics of the research sample can be found - basic identification data of a sample of respondents. The control sample of adolescents consisted of 41 children, 20 boys (48.78% of the total) and 21 girls (51.22% of the total). The average age of the interviewed adolescents aged 13–18 years was 15.54 years, and again all ages from the stated age range were represented. The youngest respondent was 13 years old, the oldest 18 years old. 41 patients did not suffer from any autoimmune diseases, only 2 suffered from asthma.

The indication "valid N" in the tables means that data from 44 respondents were used, and the possibility of erroneous data such as a poorly completed questionnaire is excluded.

Table 1. Identification data of the research sample - 44 adolescent diabetics

Descriptive statistics	N	Minimum	Maximum	Mean	Standard deviation
Age	44	13	18	15,43	1,731
HbA1c	44	38	88	60,45	11,063
Duration of the disease	44	1	16	7,48	3,938
Valid N (listed)	44				

Source Own processing

The average duration of the disease was 7.48 years, the minimum was 1 year, the maximum 16 years. The average level of glycated hemoglobin in the sample of respondents was 60.45 mmol/mol, the minimum was 38 mmol/mol and the maximum 88 mmol/mol. Diabetologists may also consider a glycated hemoglobin level of 45-58 mmol/mol to be a satisfactory rate of diabetes control for juvenile

diabetics (Glycated Hemoglobin, © 2017). These values indicate that the degree of diabetes control in the research sample of juvenile diabetics in this article can be described as unsatisfactory, although it is just above the recommended values.

In terms of treatment and associated diseases, 20 patients were treated with an insulin pen with human insulin, 11 patients were treated with an insulin pen with insulin analogues, and 13 patients were treated with an insulin pump. 27 children did not suffer from any associated autoimmune disease, 9 children suffered from thyroid disease, 6 - celiac disease, 2 - psoriasis, 1 - autoimmune hepatitis, 1 - ulcerative colitis, 1 - Leiden mutation and 2 - asthma. Of these, 2 patients suffered from thyroid disease and celiac disease at the same time, 1 patient suffered from celiac disease, psoriasis and asthma at the same time and 1 patient suffered from thyroid disease and asthma at the same time.

Both adolescents and parents assessed the quality of life. The information was distributed to the parents of the patients together with the accompanying text, or commentary at the beginning of the research before the use of standardized PedsQL questionnaires. Additionally, basic questions about the diabetic, which are related to the study of quality of life, were asked. The first, closed dichotomous question (Sedláková 2014) inquired about children's gender, then their age and method of treatment, followed by open questions asking about the duration of diabetes, the last level of glycated hemoglobin and possible associated autoimmune diseases. This was followed by the completion of standardized questionnaires. The questionnaire was always distributed only to one of the patient's parents. During the elaboration of the work, the issue of compliance with the ethics of research was not neglected, which consisted of the need to inform the respondents of the questionnaire survey about the conducted research, its goals and voluntary participation.

PedsQL

The PedsQL tool was used for the purpose of obtaining and processing the results of this work. It was selected on the basis of a search for its language availability, wide use and abundant use in the world. Individual language versions of PedsQL are available at www.pedsql.org.

Firstly, the basis for the analysis of the aim of the work was the creation of descriptive statistics of individual PedsQL modules. The content of the descriptive statistics is the sample size, the minimum and maximum of the points obtained, the means, and the standard deviations for each dimension. The value of the arithmetic mean determines the degree of the specific and general quality of life (Varni 2017). The

standard deviations indicate how much the cases in the set of examined values differ from the average of the values (Hořková *et al.* 2014). Coded data matrices were created in Microsoft Excel 2016. It was used to process the answers via points. The program was also used to create tables and graphs. The coded data matrices were processed in the statistical program IBM SPSS Statistics, through which the final results were obtained. Statistical analysis was performed for the purpose of evaluating the aims of the work. Data collection was performed using standardized questionnaires PedsQL module 3.0 - specific quality of life-related to diabetes, module 4.0 - general quality of life and module 2.0 - the impact of the disease on the family. T-test was used for statistical evaluation.

Module 4.0 PedsQL, which measures the level of the general quality of life, can be used in both healthy and sick children and for acute and chronic conditions for the mentioned age categories of respondents (Varni *et al.* 1999; Varni *et al.* 2003). For the 4.0 PedsQL module, the dimensions and number of questions contained in each of them within the same module for the selected age group 13–18 years are the same for both the diabetic child and the parents. The so-called “Report on the juvenile” is intended for adolescents. They assess the questions asked in it. The parent then receives the so-called “Parents' report on the juvenile” and answers the same questions as his/her child, but evaluates the answers based on his/her opinion (Varni, © 1998). Module 4.0 PedsQL focused on the general quality of life then asks adolescents general questions, and the answers can be used for comparison.

The same rules apply to the 3.0 PedsQL module, which measures the specific quality of life rate dependent on diabetes. The included dimensions and the number of questions are the same for the interviewed diabetics and parents in the given age category. The method of evaluation is also identical. This module, therefore, addresses specific issues related to the disease.

Module 2.0 is the so-called “Parents' statement” who have to assess the impact of the disease on the family. The significance lies in the fact that families with chronically ill children tend to have specific concerns and problems with regard to their child's health. Therefore, parents are asked specific questions, which they evaluate according to their perception. Module 2.0 is again evaluated in the same way as the previous modules, but here it is possible to divide the results into the total score, the summary indicator HRQOL and the summary score of family functioning. The Quality of Life score is gained by including all the 36 questions. If only 20 questions from the dimensions - *physical functions*, *emotional functions*, *social functions* and *cognitive functions* - are included, the summary indicator HRQOL is calculated. The total

score of family functioning is then calculated from 8 questions in the dimensions of *daily activity* and *family environment, relationships* (Varni 2017). Module 2.0 consists of eight dimensions that assess physical, social, emotional and cognitive functions, as well as communication, daily activities, family relationships and various concerns.

Evaluation of PedsQL

Specific and general quality of life is evaluated on a scale of 0-100 according to the instructions of the author of the PedsQL questionnaires. There is no lower limit of value - a measure of the quality of life that would determine how good or bad this quality is (Varni 2017). All questions from the used modules are evaluated according to the Likert scale with numbers from 0 to 4, where 0 means never = 100 points, 1 means almost never = 75 points, 2 means sometimes = 50 points, 3 means often = 25 points, 4 means almost always = 0 points. Questions are always asked in the sense of "*how big a problem it posed for you*". The time period to which the questions relate is considered to be one last month (Varni © 1998). The data processing is carried out according to the instructions of James W. Varni, the author of the questionnaire. Respondents' answers circled on the Likert scale are converted to points. Each PedsQL module is evaluated separately, after converting the answers to points, averages are counted for individual dimensions and the whole questionnaire. The author does not state the lower limit of the quality of life rate, so it is true that the higher the total score obtained (arithmetic mean value), the higher the reported health-related quality of life. The highest score can, therefore, be a maximum of 100% points (Varni 2017).

Advantages and disadvantages of the selected research

The mentioned type of questioning is considered to be the most traditional. The reason for the choice is the existence of direct feedback, which is an advantage. During the questioning, it is possible to clarify the interpretation of the question easily and obtain the necessary information by observation. Of course, it also has its disadvantages, the most substantial being that it is considered to be time-consuming, possible influence of respondents by the interviewer and reluctance of some respondents to participate in the survey (Sedláková 2014). A total of four parents of the patients wished to conduct a structured interview. The advantages of a structured interview can be seen in the possibility of observing the respondent's reactions, the completeness of filling in the prepared questionnaire (omitting questions), or providing greater comfort to

the respondent (filling in the questionnaire by the interviewer). On the other hand, disadvantages may stem from the time required, unintentionally influencing the respondents and the respondent's possible feeling of non-anonymity when answering sensitive questions (Sedláková 2014).

Availability of the research results

Pediatric diabetologists from the Diabetology Center of the Children's Clinic of the University Hospital in Pilsen have shown interest in the results of this survey. Results will, therefore, be available in their consulting rooms, and also from the parents of patients from the research sample. In the Czech Republic, only a few similar surveys have been conducted so far using the same PedsQL tool as in this work, but dealt with a different scope - often in a narrower sense when using one of the PedsQL modules, or a different age category of respondents, etc. This is also a reason why the results of the PedsQL 2.0 module were compared with the results of a foreign study.

RESULTS AND DISCUSSION

Specific and general quality of life

The specific quality of life in children with diabetes is shown in Table 2. Diabetics rate the "my diabetes" dimension as the worst - the average was 69.5250. In this dimension, children assess the symptoms of diabetes such as thirst, hunger, hypoglycemia, various types of pain, the need to go to the toilet frequently, fatigue, weakness, tremors, sweating, sleep problems or irritability. Based on the children's evaluation, the dimensions "treatment I", "communication", "concerns" follow in ascending order, and the dimensions "treatment II" received the best evaluation.

The average for the whole module is 73.2752. The results have shown that the "treatment I" factor was not confirmed at the 5% level of significance as the most influencing dimension of the specific quality of life measure.

From the overall average of 65.0169 in Table 3 per module, parents perceive the specific quality of life associated with diabetes worse than their children. The lowest score was obtained by the dimension of "concerns" - the average is 47.0077. The "treatment I", "my diabetes" and "communication" dimensions follow in ascending order, and the "treatment II" dimension received the best rating. The averages for the "Treatment I" and "Treatment II" dimensions for children and parents are not the same, but the dimensions were given the same ranking.

Table 2. Descriptive statistics module PedsQL 3.0 child - specific quality of life

Descriptive statistics	N	Minimum	Maximum	Mean	Standard deviation
Module 3.0_ child_my_diabetes	44	29,55	93,18	69,5250	15,27596
Module 3.0_ child_treatment1	44	6,25	100,00	71,8750	18,84665
Module 3.0_ child_treatment2	44	42,86	100,00	79,0586	15,56940
Module 3.0_ child_concerns	44	8,33	100,00	75,1889	21,82683
Module 3.0_ child_communication	44	,00	100,00	74,0527	25,80929
Module 3.0_ child_total	44	34,06	92,99	73,2752	13,27019
Valid N (listed)	44				

Source Own processing

Table 3. provides descriptive statistics for the PedsQL 3.0 Parent - Specific Quality of Life module.

Descriptive statistics	N	Minimum	Maximum	Mean	Standard deviation
Module 3.0_ diabetes_parent	39	29,50	88,60	64,9128	13,31112
Module 3.0_ parent_treatment1	39	6,30	93,80	61,7256	19,35904
Module 3.0_ parent_treatment 2	39	42,90	100,00	73,9949	17,00921
Module 3.0_ parent_concerns	39	8,30	100,00	47,0077	21,92274
Module 3.0_ parent_communication	39	8,30	100,00	70,7256	26,97180
Module 3.0_ parent_total	39	34,06	92,07	65,0169	12,38875
Valid N (listed)	39				

Source Own processing

At the 5% level of significance with the result of a two-sample T-test ($t = 2.919$, when $p = 0.005$ and the overall average for the module PedsQL 3.0 - parents 65.0169 and child 73.2752) it can be stated that the rate of the specific quality of life perceived by parents is worse than the rate of the quality of life perceived by children with diabetes from the research sample.

Table 4. Descriptive statistics - module PedsQL 4.0 child - general quality of life

Descriptive statistics	N	Minimum	Maximum	Mean	Standard deviation
Module 4.0_ my_physical_health_and_activities	44	50,00	100,00	87,6523	10,80696
Module 4.0_ my_feelings	44	10,00	100,00	71,4773	20,81423
Module 4.0_ child_how_I relate to others	44	25,00	100,00	86,0227	17,86837
Module 4.0_ child_at_school	44	,00	95,00	63,7500	17,82098
Module 4.0_ child_total	44	32,61	100,00	80,7911	12,72750
Valid N (listed)	44				

Source Own processing

From Table 4 it can be understood that adolescent diabetics evaluate the dimension "at school" as the worse - the average was 63.7500. In this dimension, children evaluate problems at school related to maintaining attention, managing school duties, forgetting things and absences from school due to health. In terms of the research results, the dimensions "my feelings", "how I get along with others" were evaluated in ascending order, and the dimensions "my physical health and activities" received the best evaluation. The average for the whole module is 80.7911.

The total average per module - 72.9900 indicates that parents again assess the general quality of life worse than their children. It can be noted that this information applies to all dimensions. The lowest score was obtained by the dimension of "school activity" - the average is 60.2564. The dimensions of "emotional health", "social activities" follow in ascending order, and the dimensions of "physical health and activities" received the best evaluation. The averages for the dimensions for children and parents do not match, but all dimensions were given the same order.

At the 5% level of significance with the result of a two-sample T-test $t = 2.579$, when $p = 0.012$ and the overall average for the module PedsQL 4.0 - parents 72.9900 and child 80.7911 it can be stated that the general quality of life perceived by parents is worse than the quality of life perceived by children with diabetes from the research sample.

Table 5. Descriptive statistics module - PedsQL 4.0 parent - general quality of life

Descriptive statistics	N	Minimum	Maximum	Mean	Standard deviation
Module 4.0_parent_physical_health_and_activities	39	37,50	100,00	80,6891	14,89878
Module 4.0_parent_emotional_health	39	10,00	100,00	63,3333	19,47783
Module 4.0_parent_social_activities	39	20,00	100,00	76,4103	20,54996
Module 4.0_parent_school_activities	39	,00	90,00	60,2564	17,80555
Module 4.0 parent total	39	32,61	93,70	72,9900	14,83011
Valid N (listed)	39				

Source Own processing

Table 6. Descriptive statistics module PedsQL 4.0 - a child from the control group of general quality of life

Descriptive statistics	N	Minimum	Maximum	Mean	Standard deviation
Modul 4.0_CG_my_physical_health_and_activities	41	59,38	100,00	86,1280	9,13892
Modul 4.0_CG_my feelings	41	30,00	90,00	69,1463	13,50474
Modul 4.0_KS_how_I relate to others	41	40,00	100,00	83,4146	12,72001
Module 4.0_KS_at school	41	30,00	95,00	73,0488	13,41073
Module 4.0_KS_total	41	53,93	92,50	79,4068	7,97810
Valid N (listed)	41				

Source Own processing

Table 6 shows the descriptive statistics of the PedsQL 4.0 module - a child from the control group -

general quality of life. The table shows that adolescents rate "my feelings" dimension as the worst - the average was 69.1463. The dimensions "at school", "how I relate to others" follow, and the dimensions "my physical health and activities" received the best evaluation. Compared to healthy children, only the area of school activities rated children with diabetes worse, but not significantly. The average for the whole module is 79.4068.

At the 5% level of significance with the result of a two-sample T-test ($t = 0.596$, where $p = 0.553$ and the total average for module PedsQL 4.0 - child diabetic 80.7911 and child from the control group - 79.4068 there was no statistically significant difference between children with diabetes and a control sample in the report of the general quality of life measure.

Table 7. Descriptive statistics module PedsQL 2.0 parent - results of three possible evaluations

Descriptive statistics	N	Minimum	Maximum	Mean	Standard deviation
Module 2.0.0_physical_functions	39	41,70	100,00	67,5154	19,35981
Module 2.0_feelings_and_emotional_functions	39	25,00	100,00	58,0769	19,31782
Module 2.0.0_social_function	39	31,30	100,00	69,5718	21,22693
Module 2.0_cognitive_function	39	25,00	280,00	74,3590	40,72015
Module 2.0.0_communication	39	8,30	100,00	67,3051	25,60851
Module 2.0_concerns	39	20,00	95,00	61,1538	19,34661
Module 2.0.0_day_activities	39	16,70	100,00	67,7436	23,65401
Module 2.0_family_environment_relationships	39	25,00	100,00	72,1359	21,83151
Module 2.0_total	39	36,30	126,70	66,3769	19,29705
Valid N (listed)	39				

Source Own research

The overall average per module was 66.3769. The lowest score was obtained by the dimension of "emotional function" - the average is 58.0769. The following dimensions are in ascending order: "concerns", "communication", then "physical functions" and "daily activities" - those were very

balanced. The " social functions ", " family environment, relationships " and " cognitive functions " were given the best evaluation.

The results of this module, as already mentioned in the methodology, can be evaluated in 3 ways. The stated overall average corresponds to the overall score, i.e. if all 36 questions are included. The summary HRQOL indicator is 67.3808 and is obtained by including 20 questions from the first 4 dimensions - " physical functions ", " emotional functions ", " social functions " and " cognitive functions ". The total score of family functioning is 69.9398 and is calculated from 8 questions in the dimensions of " daily activity " and " family environment, relationships ".

The impact of chronic autoimmune disease on the family

The last area examined in this work was the impact of chronic autoimmune disease on the family. The aim was to ascertain the level of quality of life reported by parents of diabetic children aged 13–18 years and then to compare the results with the results of a foreign study that dealt with the same research.

At the 5% level of significance with the result of a one-sample T-test $t = -0.328$, when $p = 0.745$ and the overall average for the PedsQL 2.0 module - influence on family - parents from the sample in this work 66.3769 and a sample from a foreign study 67.39 (Albuhairan *et al.* 2016) the following can be stated: A cross-sectional study " *Health-related quality of life and family impact of the type 1 diabetes among adolescents in Saudi Arabia* " conducted in Saudi Arabia states in the module *the effect on the family* the lowest score for " *concerns* " - average 42.08, low score 59.8 for " *emotional functions* ", followed by " *physical functions* ", " *daily activities* ", " *cognitive functions* ", " *social functions* ", " *communication* " and a high score of 80.9 for the dimension " *family environment, relationships* ". The summary HRQOL indicator is 66.72. The overall family functioning score is 73.07 (Albuhairan *et al.* 2016). Based on testing, in fact, a statistically significant difference was not found among the samples concerning the quality of life measure related to the influence of chronic disease of the child on the family. From the results of the module influence on the family in this work, the dimension " emotional function " obtained the lowest score- the average is 58.0769. The dimension of " *concerns* " ascending, the dimension of " *communication* ", " *physical functions* " and " *daily activities* " were very balanced, the " *social functions* ", the " *family environment, relationships* " and the " *cognitive functions* " were given the best evaluation. The summary HRQOL indicator is 67.3808. The total score for family functioning is 69.9398.

These results show that the placement of the dimensions in the order of the two samples differs slightly, however, in both cases, the " emotional function " and " concerns " dimensions received low scores. All in all, it speaks of feelings of anxiety, sadness, anger, frustration and helplessness. Parents are concerned about the effects of medications, side effects, reactions of the environment to the child's health, they are worried about his/her future and may be concerned about the impact of the child's disease on other family members. The results of module 2.0 PedsQL "effect of the disease on the family as a whole", therefore, suggest that diabetes may have a negative impact on the mental well-being of parents (Albuhairan *et al.* 2016).

The highest score in the foreign study was obtained by " family environment, relationships " and " communication ". In the Czech sample, the " family environment, relationships " was also well evaluated - it gained the 2nd highest place. However, it was worse with the position of " communication " - it was rated as the 3rd worst. Generally speaking in the foreign study, parents rated the mentioned " communication " significantly better - the average was 78.43, in the Czech sample 67.3051 and " family environment, relationships " - the average was 80.9, in the Czech sample 72.1359. The overall score of the functioning of the family happened to be better in the foreign study. Averages for the individual dimensions of the module PedsQL 2.0, with the exception of the aforementioned more profound differences, differ only slightly. The obtained total scores are very similar in both groups.

The results of a study that examined shared self-control and the interaction of family members, i.e. parents and children, say that it is possible to share the burden of the disease. After assessing the whole family system and possible interventions, it is possible to improve the quality of life and adherence to the treatment regimen in adolescent diabetics (Lansing *et al.* 2017). On the other hand, another study that mentions the focus of treatment programs on enhancing glycemic control points to the fact that interventions should include efforts to reduce diabetes-specific family conflict in order to maintain the child's overall quality of life. The results of the study suggest that a higher rate of diabetes-specific family conflict predicts a reduction in the child's quality of life (Laffel *et al.* 2003).

Variable factors influencing the quality of life

Furthermore, the variable factors were examined - age, duration of the disease and the method of treatment depending on the specific and general quality of life in adolescent diabetics. The analysis of variance did not reveal a significant effect on specific and general quality of life for any of the factors tested. Thus, it was

not confirmed in the research sample that the duration of diabetes affects the level of quality of life the most of all the above factors. The assumption that these factors affect the quality of life were the results of some available foreign studies. The reason for the different results may be the possibility that the results of the statistical survey could be significantly limited, because it was a test of dependence on a small sample of respondents and the basis was therefore insufficient information.

Quality of life of children with type 1 diabetes mellitus in connection with foreign research

The results of the Spanish study show that quarterly meetings of patients with an average age of 13.4 with their doctors, which lasted more than 1 year and used personal discussion and routine HRQOL assessment, improved these patients' HRQOL scores, especially in the school environment and psychological well-being. (Murillo *et al.* 2017). Improved HRQOL in German research was reported by adolescents with good metabolic regulation, better mental well-being, and children with higher levels of well-being at school (Wagner *et al.* 2005).

The Swedish study, which examined the perception of the quality of support in diabetes care during school attendance by children and adolescents between 2008 and 2015, concluded that diabetic children and adolescents felt in 2015, greater support from the school than in 2008, they were treated less differently due to their illness. 83% of adolescents aged 13-15 were satisfied with the support they received. In terms of gender, satisfaction was lower among girls. The results show that girls need more support and hypoglycemia treatment needs to be supported, which was more frequent among respondents during school hours than in 2008 - in 2015, 84% received it compared to the previous 70% (Ottosson *et al.* 2017). The noticeable positive development of support for Swedish schoolchildren with diabetes resulting from the study is considered an important step forward in an area that should continue to be addressed not only in Sweden.

The Turkish study focused on determining the quality of life and influencing factors in children and adolescent patients, as this pediatric chronic autoimmune disease may have negative effects on children's health care and development, which is further related to the deterioration of their quality of life in these individuals. The results show that the quality of life of children and adolescents correlates with the quality of life of their parents. The level of HbA1c negatively correlated with the quality of life in adolescents, similarly a negative correlation was found between the number of children in the family and the

quality of life of family members. (Ozyazicioglu *et al.* 2017).

In comparison with the results of foreign studies dealing with the quality of life of diabetics and examining these dependencies on larger samples of respondents, we came to the conclusion that in the Czech environment it is necessary to conduct a deeper examination of factors affecting the quality of life of young diabetics in a representative sample of the Czech population. It is known that the quality of life changes during life and especially during the development of a child into an adult. The results support the routine use of HRQOL assessments in clinical practice (Murillo *et al.* 2017). HRQOL is a practical and validated general measure that facilitates health monitoring, risk assessment, and measurement of treatment outcomes in the pediatric population (Varni © 1999).

Type 1 diabetes mellitus and modern technology

By developing and identifying new effective and acceptable technologies for patients, it is possible to improve the care, control and adherence to the treatment regimen (Di Bartolomeo *et al.* 2017). The development of technology thus makes it possible to lead a better life. However, with modern technologies, there is the problem of financing. For these cost a considerable sum, which must be financed by parents. As for reimbursement through health insurance companies, the situation is not easy. Children with single parents or from underprivileged families lack in modern ways of treatment. In addition, after reaching the age of 18, any reimbursement from the insurance company decreases sharply. From an economic point of view, it is a well-known argument that the better the diabetic is controlled the lower the risk of subsequent complications. Therefore, there is a claim that the investment in children of diabetics by the state and health insurance companies will pay off many times over. The effects are also noticeable in society. Statistics show that there are more diabetics in secondary and higher education than in the average population. Diabetics compared with non-diabetics classified at the higher rungs of the social ladder. Thanks to lifelong learning, discipline and responsibility from an early age are diabetics becoming a strong-minded personality (Cerqueirová © 2015-2018). Increasing possibilities in the use of modern technologies predict an incomparably higher chances of today's children living a life without late complications compared to children in whom diabetes manifested 15 years ago (Šumík © 2019).

As for current technologies helping in the treatment of type 1 diabetes, FreeStyle Libre - a system for continuous glycemic monitoring - has been available to Czech patients since October 2018. Until recently,

patients had a difficult time shopping for sensors, especially in Poland and Germany. It is a hybrid system - glucometer and continuous blood glucose monitoring at the same time. The sensor is inserted into the subcutaneous tissue and continuously measures blood glucose, and the receiver is, for example, a mobile phone or a glucometer from the manufacturer, but data is transmitted to the receiver only when it approaches the sensor. The advantage is one more soulful, almost painless, less stressful and discreet measurement. Extreme fluctuations in blood sugar, or hypoglycemia must in any case be always checked, since the sensor cannot warn about them (FreeStyle Libre ... © 2018).

A novelty approved in the United States in March 2018 is Dexcom 's revolutionary integrated G6 CGM system , which is to be integrated into future insulin pump systems and therefore does not require fingers for calibration or treatment decisions (Brown 2018).

There is also the possibility of transplantation of insulin- producing cells, but this is not possible without the administration of strong immunosuppressive drugs and is performed in patients with serious complications. However, a project focused on cell therapy is currently underway. It is a collaboration between the pharmaceutical company Eli Lilly and the biotechnology company Sigilon Therapeutics. Cell therapy is based on the development of beta- modified stem cells that produce insulin, followed by encapsulation using special technology. The aim is to restore insulin production without causing an immune reaction of the body and at the same time without the administration of powerful immunosuppressive drugs - immune suppression would not be needed then (New Technology ..., © 2018). In conclusion, the research and development of the new technologies and technological progress make it easier for lifelong patients with autoimmune diabetes mellitus type 1 treatment process and gives hope.

CONCLUSION

The above analyzes of the research results show that the level of the specific quality of life according to PedsQL 3.0 is perceived by parents of children with type 1 diabetes mellitus as worse than it is perceived by the children who participated in the research. In terms of individual dimensions, these children show the worst score in the area of "my diabetes", while parents perceive the area of "concerns" as the worst. Even the general quality of life tested by the PedsQL 4.0 questionnaire is evaluated more negatively by parents of children with type 1 diabetes than by their offspring. Regarding the dimension in which the worst score was reported, both groups agreed on the dimension of "school activity". While the individual scores did not match at all, the order of the dimensions was the same

in both groups. The evaluation of parents was worse than their children for all individual dimensions in the module of the specific and general quality of life without exception.

Regarding the results of module 4.0 within the PedsQL questionnaire, when the general quality of life of children with type 1 diabetes mellitus was compared with a control sample of children who do not have this disease, they estimate that no statistically significant difference was found and their general quality of life, therefore, does not differ significantly. The effect of the disease on family functioning was assessed by module 2.0 of the PedsQL questionnaire and it was found that the greatest difficulties are reported in the area of "emotional and function".

The last area examined was the impact of chronic autoimmune disease on the family and its comparison with foreign studies that dealt with the same research. The analysis showed that the results of Czech and foreign research conducted in Saudi Arabia (Albuhairan *et al.* 2016) do not show statistically significant differences and in terms of individual dimensions, the order of evaluation differs only slightly. The biggest difference is that according to the results of Czech research, families communicate less well and have worse relationships with each other. However, as already mentioned, the overall results show no statistically significant difference.

Research has also shown that the variables examined - age, duration of illness and method of treatment - do not have a significant effect on the specific and general quality of life of adolescent diabetics. However, it would be appropriate to conduct a deeper examination of these factors influencing the quality of life of young diabetics on a representative sample of the Czech population.

The main benefit of the research lies in the results, which provide valuable insight into the quality of life of children and adolescents with type 1 diabetes mellitus. It is vital and beneficial to have these within the framework of setting up and adhering to a treatment regime that requires discipline, during adolescence, especially when in some patients the unsatisfactory control of diabetes prevails.

Conflict of interests:

The authors have no conflict of interests to declare.

BIBLIOGRAPHY

1. Albuhairan F *et al.* (2016). Health related quality of life and family impact of type 1 diabetes among adolescents in Saudi Arabia. Diabetes research and clinical practice. 2016 [online], 114, 173–179 [cit. 2018-05-31]. DOI: <https://doi.org/10.1016/j.diabres.2016.01.001>.

- Available from: <https://www.sciencedirect.com/science/article/pii/S0168822716000036#!>
2. Brown G (2018). FDA Approval: Dexcom G6 [online]. 27.3. 2018 [cit. 2018-06-01]. Available from: <https://beyondtype1.org/fda-approves-dexcom-g6/>
 3. Brož J (2012). Co je to diabetes mellitus? Praha: 2012. ISBN 978-80-904809-8-8.
 4. Burešová G *et al.* (2008). Health related quality of life of children and adolescents with Type 1 diabetes. *Neuro Endocrinol Lett.* 2008; **29**(6): 1045–1053.
 5. Cerqueirová A (©2015–2018). Děti s cukrovkou mohou všechno. Přesto je jim leccos zbytečně upíráno. Náš region [online]. ©2015–2018, 30. 4. 2018 [cit. 2018-06-02]. Available from: <http://nasregion.cz/deti-s-cukrovkou-mohou-jist-vsechno-presto-je-jim-zbytecne-upirano-proc-38688>
 6. Di Bartolo P *et al.* (2017). Young patients with type 1 diabetes poorly controlled and poorly compliant with self-monitoring of blood glucose: can technology help? Results of the i-NewTrend randomized clinical trial. *Acta Diabetologica* 2017; **54**(4): 393–402 [online]. [cit. 2018-04-11]. DOI: 10.1007/s00592-017-0963-4. Available from: http://apps.webofknowledge.com.zdroje.vse.cz/full_record.do?product=WOS&search_mode=GeneralSearch&qid=10&SID=E3SmJnun3yHusoP5UVJ&page=1&doc=1
 7. Dítě s diabetem aneb jak změni dětská cukrovka život celé rodině. (©2015). Fit pro život: časopis zdraví, zdatnosti a půvabu [online]. ©2015 [cit. 2018-06-02]. Available from: <http://www.euro-media.cz/cs/fit-pro-zivot/rubriky/dite/412-dite-s-diabetem-aneb-jak-zmeni-detska-cukrovka-zivot-cele-rodine>
 8. Edelsberger T (2009). Encyklopedie pro diabetiky. Praha: Maxdorf 2009. ISBN 978-80-7345-189-9.
 9. FreeStyle Libre vstupuje na český trh. DIAstyl: Váš průvodce světem diabetu. ©2018 [online]. 4.5. 2018 [cit. 2018-06-01]. Available from: <https://www.diastyl.cz/freestyle-libre-konecne-v-cr/>
 10. Glykovaný hemoglobin. MTE: prodej zdravotnické techniky pro diabetiky. ©2017 [online] [cit. 2018-06-01]. Available from: <http://www.mte.cz/vse-o-diabetes/lecba-diabetes/glykov-any-hemoglobin>
 11. Horák P (2009). Farmakoeconomika léčby diabetu – trendy u nás. *Vnitřní lékařství* 2009; **55** (4): 331–340 [online] [cit. 2018-06-06]. Available from: http://www.prolekare.cz/vnitri-lekarstvi-clanek/farma_koeconomika-lecby-diabetu-trendy-u-nas-34194
 12. Hošková P *et al.* (2014). Statistika v manažerské a obchodní praxi: Základní metody a postupy řešení v programu STATISTICA, Katedra statistiky. Provozně ekonomická fakulta, 2014.
 13. Karen I, Svačina Š (2014). Diabetes mellitus v primární péči. Vyd. 2. rozš. Praha: Axonite CZ, 2014, 264 s. ISBN 978-80-904899-8-1.
 14. Kudlová P (2015). Ošetrovateľská péče v diabetologii. Praha: Grada Publishing 2015. ISBN 978-80-247-5367-6.
 15. Laffel LMB *et al.* (2003). General quality of life in youth with type 1 diabetes – Relationship to patient management and diabetes-specific family conflict. *Diabetes Care.* 2003; **26**(11): 3067–3073 [online] [cit. 2018-04-11]. DOI: 10.2337/diacare.26.11.3067. Available from: http://apps.webofknowledge.com.zdroje.vse.cz/full_record.do?product=WOS&search_mode=GeneralSearch&qid=18&SID=C3QZi4Xv9Js8TjQhBWC&page=1&doc=1
 16. Lansing AH *et al.* (2017). Mother, father, and adolescent self-control and adherence in adolescents with type 1 diabetes. *Journal of Family Psychology* 2017; **31**(4): 495–503 [online] [cit. 2018-04-11]. DOI: 10.1037/fam0000292. Dostupné z: http://apps.webofknowledge.com.zdroje.vse.cz/full_record.do?product=WOS&search_mode=GeneralSearch&qid=9&SID=C3QZi4Xv9Js8TjQhBWC&page=1&doc=2
 17. Lebl J *et al.* (2016). Dětská endokrinologie a diabetologie. Galén, 2016. ISBN 978-80-7492-271-8.
 18. Mareš J *et al.* (2006). Kvalita života u dětí a dospívajících I. Brno: MSD 2006. ISBN 80-86633-65-9.
 19. Matematická biologie (2020). Centrální limitní věta. Institut biostatistiky a analýz Lékařské fakulty Masarykovy univerzity; 2020 [online] [cit. 2020-05-12]. Available from: <https://portal.matematickabiologie.cz/index.php?pg=aplikovana-analyza-klinicky-a-biologicky-dat--analyza-a-management-dat-pro-zdravotnicke-obory--bodove-a-intervalove-odhady--teoreticke-pozadi-intervalovych-odhadu--centralni-limitni-veta>
 20. Murillo M *et al.* (2017). Impact of monitoring health-related quality of life in clinical practice in children with type 1 diabetes mellitus. *Quality of Life Research* 2017; **26**(12): 3267–3277 [online] [cit. 2018-04-11]. DOI: 10.1007/s11136-017-1682-6.
 21. Nová technologie má obnovit produkci inzulínu. DIAstyl: Váš průvodce světem diabetu [online]. ©2018, 11. 4. 2018 [cit. 2018-06-01]. Available from: <https://www.diastyl.cz/nova-technologie-ma-obnovit-produkci-inzulinu/>
 22. Ottosson AB *et al.* (2017). Self-care management of type 1 diabetes has improved in Swedish schools according to children and adolescents. *Acta Paediatrica* 2017; **106**(12): 1987–1993 [online] [cit.

- 2018-04-11]. DOI: 10.1111/apa.13949.
23. Ozyazicioglu N *et al.* (2017). A determination of the quality of life of children and adolescents with type 1 diabetes and their parents. *International Journal of Nursing Sciences* 2017; **4**(2): 94–98 [online] [cit. 2018-04-11]. DOI: 10.1016/j.ijnss.2017.01.008. Available from: http://apps.webofknowledge.com.zdroje.vse.cz/full_record.do?product=WOS&search_mode=GeneralSearch&qid=1&SID=E3SmJnun3yHusoP5UVJ&page=1&doc=2
 24. Pelikánová T, Bartoš V (2011). *Praktická diabetologie*. 5. akt. vyd., Praha: Maxdorf 2011. 742 p. ISBN 978-80-7345-244-5.
 25. Perušičová J (2014). *Diabetes mellitus a endokrinologie: průvodce pro každodenní praxi*. Praha: Maxdorf 2014. 118 p. ISBN 978-80-7345-400-5.
 26. Říčan P (2014). *Cesta životem: Vývojová psychologie*. vyd. 3. Praha: Portál 2014, 390 p. ISBN 978-80-262-0772-6.
 27. Sedláková R (2014). *Výzkum médií: neužívanější metody a techniky*. Praha: Grada 2014, 539 p. ISBN 978-80-247-3568-9.
 28. Šafránková A, Nejedlá M (2006). *Interní ošetřovatelství II*. Praha: Grada 2006. ISBN 978-80-247-1777-7.
 29. Šumník Z (©2018). *Dětská diabetologie*. Česká diabetologická společnost. ©2018 [online] [cit. 2018-05-12]. Dostupné z: <http://www.diab.cz/detska-diabetologie>
 30. The WHOQOL Group. The World Health Organization Quality of Life Assessment (WHOQOL): measuring quality of life; 1997. [online] [cit. 2007-06-11]. Available from: http://www.who.int/mental_health/media/68.pdf
 31. Varni JW *et al.* (2003). The PedsQL((TM)) in type 1 and type 2 diabetes. *Diabetes Care* 2003; **26**(3): 631–637 [online] [cit. 2018-04-11]. DOI: 10.2337/diacare.26.3.631. Available from: http://apps.webofknowledge.com.zdroje.vse.cz/full_record.do?product=WOS&search_mode=GeneralSearch&qid=15&SID=C3QZi4Xv9Js8TjQhBWC&page=2&doc=12
 32. Varni JW, Seid M, Rode CA (1999). The PedsQL: measurement model for the pediatric quality of life inventory. *Med Care*. 1999; **37**(2): 126–139 [online] [cit. 2018-04-11]. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/10024117>
 33. Varni JW (©1998). *PedsQL TM Dotazník o pediatrické kvalitě života: Modul Diabetes*. ©1998. Available from: <http://www.pedsqol.org>
 34. Varni JW. *PedsQL TM Dotazník o pediatrické kvalitě života: Version 4.0 - Czech (Czech Republic)*. ©1999. Available from: <http://www.pedsqol.org>
 35. Varni JW (2017). *Scaling and scoring of the Pediatric quality of life inventory TM: PedsQL TM. Version 17*. 2017 [online]. Available from: <http://www.pedsqol.org>

SEBACEOUS CARCINOMA OF THE EYELIDS SEBACEÓZNY KARCINÓM MIHALNÍC

Eva SVORADOVÁ,¹ Juraj SEKÁČ,¹ Pavol KUSENDA,¹ Pavel BABÁL²

¹ Dept. of Ophthalmology, Faculty of Medicine, Comenius University
and University Hospital Ružinov in Bratislava, Slovakia

² Institute of Pathological Anatomy, Faculty of Medicine,
Comenius University in Bratislava and University Hospital Bratislava

Contact address: Eva Svoradová, Holubyho 3, 921 01 Piešťany, e-mail: svoradova10@uniba.sk

ABSTRACT Introduction: Sebaceous carcinoma (SC) of the eyelids is a rare malignant tumor that leads to decreased visual acuity and increased mortality rate. It is considered to be the third most common malignant tumor of the eyelids accounting for 1-5,5% cases of all malignant eyelid tumors.

Aim: The aim of this article is to evaluate the occurrence of SC at Dept. of Ophthalmology, Faculty of Medicine, Comenius University and University Hospital Ružinov in Bratislava and to compare the occurrence of SC with occurrence of other eyelid carcinomas in observed period (1.12.2017-31.12.2019). We also evaluate another aspects of occurrence of SC.

Material and Methods: We used histopathological findings of patients at Dept. of Ophthalmology in observed period (1.12.2017-31.12.2019) to evaluate the occurrence of SC. We used graphs and tables to statistically illustrate our findings.

Results: We observed 86 cases of patients with 90 eyelid carcinomas. Among these we observed 80% of basocellular carcinomas (72 cases), 11% of spinocellular carcinomas (10), 4,4% of sebaceous carcinomas (4), 3% of Morbus Bowen (3) and 1% of Merkel cell carcinoma (1). We also observed primary anatomical location of sebaceous carcinomas and the age and gender distribution of patients with sebaceous carcinomas.

Conclusion: According to the literature, we found SC to be the third most common eyelid malignancy. The occurrence of SC in regard to age and gender of patients as well as observed location of tumor was in accordance with the literature.

Keywords: sebaceous carcinoma, eyelids, eye

ABSTRAKT Úvod: Sebaceózný karcinóm (SC) mihalníc je vzácné malígne nádorové ochorenie, ktoré môže viesť k poklesu zrakovej ostrosti ako aj k zvýšenému riziku mortality. Je považovaný za tretí najčastejší zhubný nádor postihujúci oblasť mihalníc, predstavuje 1-5,5% všetkých zhubných nádorov mihalníc.

Cieľ práce: Cieľom práce je zhodnotiť výskyt SC mihalníc na Klinike oftalmológie LFUK a UN Bratislava v porovnaní s výskytom iných karcinómov mihalníc za sledované obdobie 1.12.2017-31.12.2019. Hodnotíme tiež ostatné aspekty výskytu SC.

Materiál a metodika: V práci spracúvame histopatologické nálezy pacientov, ktorí boli liečení na Klinike oftalmológie LFUK a UN Bratislava v sledovanom období (od 1.12.2017 do 31.12.2019). Údaje spracúvame štatisticky v podobe tabuliek a grafov.

Výsledky: V sledovanom období pozorujeme 86 prípadov pacientov s 90 karcinómami mihalníc. Z tohto počtu sa u 80% (72) pacientov vyskytol bazocelulárny karcinóm, u 11% (10) spinocelulárny karcinóm, u 4,4% (4) sebaceózný karcinóm, u 3% (3) Morbus Bowen a u 1%

(1) karcinóm z Merkelových buniek. Pozorovali sme taktiež anatomickú lokalizáciu sebaceózných karcinómov a vekovo-pohlavnú štruktúru pacientov so SC.

Záver: SC je v nami pozorovanom súbore v súlade s literatúrou tretím najčastejším karcinómom mihalníc. V súlade s literatúrou bol taktiež výskyt SC vzhľadom na vek a pohlavie pacientov ako aj miestna predilekcia tohto nádoru.

Kľúčové slová: sebaceózný karcinóm, mihalnice, oko

INTRODUCTION

Malignant tumors of the eyelids are rare malignancies (Furdová *et al.* 2013; Furdová *et al.* 2015). Sebaceous carcinoma of the eyelid is a rare, aggressive malignant tumor reported for the first time by Straatsma in 1956 as Meibomian gland carcinoma. SC arises from cells that form sebaceous glands (glandulae sebaceae). Sebaceous glands produce an oily matter, sebum, which creates a thin, hydrophobic layer on the skin that lubricates the skin and slows down the evaporation of sweat. There are five types of sebaceous glands in the periocular region- meibomian glands, glands of Zeis, glands of the caruncle, glands of the fine hair follicles of the eyelid and sebaceous glands of the eyebrows (Buitrago *et al.* 2008). The majority of sebaceous carcinomas arises from the meibomian glands located in the tarsus of the eyelid.

Sebaceous carcinoma represents 0,2-4,6% of all malignant skin tumors. Depending on geographical location, it is a second or a third most common eyelid malignant tumor after basocellular and spinocellular carcinoma. It represents 0,2-0,8% of eyelid tumors, 1-3,2% of malignant eyelid tumors and 2,8% of tumors invading periorbital area (Knackstedt *et al.* 2017; Wu *et al.* 2020).

Risk factors for SC include higher age, female sex or Indian and Asian ethnicity. Genetic factors are also important, SC has been associated with Muir-Torre syndrome, which is a genetic disease characterised by occurrence of various sebaceous neoplasms including SC, caused by mutations in DNA repair genes. Another genetic factors associated with SC include mutations of TP53 tumor suppressor gene or transcription factor LEF1. Immunosuppressive therapy is another risk factor associated with SC, including patients after transplantation as well as patients with HIV or HPV infection. Another risk factors for SC are ionising radiation, diuretics use and chalazion.

SC usually presents as a painless, hard, subcutaneous nodule on the eyelid. Another forms of

clinical presentation include cystic nodule, painless papule, diffuse thickening of the eyelid, pedunculated lesion or extensive invasion. Sebaceous carcinoma may cause atrophy, loss of cilia or ectropion. Surrounding skin may be yellow because of the presence of lipids. It can resemble various inflammatory conditions (especially chalazion), which can lead to delayed diagnosis, causing increased morbidity and mortality rates (Shields *et al.* 2005; Knackstedt *et al.* 2017, Furdová *et al.* 2003). Epibulbar lesions are very close to malignant lesions of the eyelids due to their clinical signs (Furdová *et al.* 2019). As sebaceous carcinoma is a rare adnexal tumor, its treatment evidence relies on small to medium size case reports. Primary treatment modality for SC is surgery, either performed as Mohs micrographic surgery or as a wide local excision. Mohs micrographic surgery is considered to be preferable therapy of SC of the eyelids, suitable for almost any location of SC. Wide local excision is a historically standard treatment modality of SC. Advanced cases of SC may be treated with orbital exenteration, radiation therapy, cryotherapy, topical or systemic chemotherapy or combination therapy. Eyelid malignancies can lead in advanced stages to radical surgical therapy with large cosmetic defects, which have to be covered by epithesis (Furdová *et al.* 2016). Large defects after surgical treatment lead to serious social and psychological problems (Furdová *et al.* 2018).

AIM

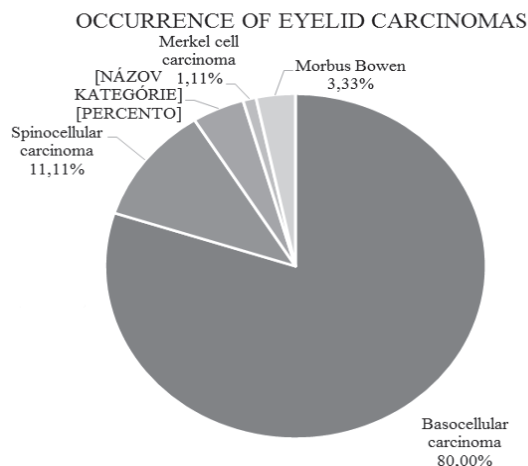
The aim of this article is a retrospective analysis of data of patients with SC at Dept. of Ophthalmology, Faculty of Medicine, Comenius University and University Hospital Ružinov in Bratislava. We evaluate the occurrence of SC of the eyelids in comparison with the occurrence of other eyelid carcinomas at Dept. of Ophthalmology during observed period from 1.12.2017 to 31.12.2019. We also evaluate another aspects of occurrence of SC, such as age and gender distribution of patients with SC and location of the tumor.

MATERIAL AND METHODS

To analyse data of patients with SC, we use histopathological findings of patients at Dept. of Ophthalmology, Faculty of Medicine, Comenius University and University Hospital Ružinov in Bratislava from observed period (1.12.2017 to 31.12.2019). The selection criterion is presence of eyelid carcinoma in patients. Data tabulated included type of tumor, age and gender of patients with SC and location of sebaceous carcinomas. We use tables and graphs to illustrate our findings.

RESULTS

We observed 86 patients with eyelid carcinoma and 90 eyelid carcinoma cases (there was more than 1 eyelid carcinoma in 4 patients). Of these, 72 (80%) patients had basocellular carcinoma, 10 (11,1%) patients had spinocellular carcinoma, SC was observed in 4 (4,4%) patients and we also observed 3 (3,3%) cases of Morbus Bowen and 1 (1,1%) Merkel cell carcinoma (see Graph 1 and Table 1).



Graph 1. Occurrence of eyelid carcinomas at Dept. of Ophthalmology in observed period 12/2017-12/2019 (Source: own research)

Table 1. Number and per cent proportion of eyelid carcinomas at Dept. of Ophthalmology in observed period (Source: own research)

Basocellular carcinoma	72	80,00%
Spinocellular carcinoma	10	11,11%
Sebaceous carcinoma	4	4,44%
Morbus Bowen	3	3,33%
Merkel cell carcinoma	1	1,11%

We also observed another aspects of occurrence of SC- anatomical location of the tumor, age and gender distribution of patients with SC. We found that in all cases of SC (4 patients), the tumor was localized in the eyelid. In 3 patients, primary anatomical location of the tumor was the upper eyelid and in 1 patient, the tumor was localized in the lower eyelid. Concerning age distribution of the patients, the age of our patients in the time of diagnosis was 24, 65, 72 and 75 years with average value 59 years. Concerning gender distribution, 3 of our patients were female and 1 patient was a male.

DISCUSSION

The occurrence of SC depends on the ethnicity. In Caucasians, SC accounts for 1-5,5% of all eyelid malignant tumors, whereas in Chinese and Japanese, SC accounts for 37,5-39% of all eyelid malignant tumors. In the Indian population, SC accounts for 31,2% of all eyelid malignancies and 10,2% of all eyelid malignancies in Singapore. The cause of higher occurrence in Asian population is considered to be either genetic and racial factors or lower occurrence of other eyelid malignancies. Due to this fact, SC is either second or third most common eyelid malignant tumor after basocellular and spinocellular carcinoma. In Caucasians, it is usually the third most common eyelid malignancy, whereas it is the second most common eyelid malignancy in Chinese and Japanese (Deprez *et al.* 2009; Mulay *et al.* 2013; Xu *et al.* 2008).

Our findings are in compliance with the literature. We found basocellular carcinoma to be the most common eyelid malignancy with observed occurrence 80%, followed by spinocellular carcinoma observed in 11,1% of cases and SC was the third most common eyelid malignant tumor with observed occurrence 4.4%. Morbus Bowen, as carcinoma in situ, was presented in 3,3% of cases and Merkle cell carcinoma was presented in 1,1% of cases.

According to anatomical location, sebaceous carcinomas present as ocular or extraocular tumors. The ocular form of SC affects upper (63%) or lower (27%) eyelid, both upper and lower eyelid (5%), caruncle (3%) and other locations (2%) - cornea, conjunctiva, medial canthus, lateral canthus and supercilium. Higher occurrence of SC in the upper eyelid than in the lower eyelid is probably caused by the fact, that SC usually originates in the meibomian glands of the tarsus, which are more abundant in the upper eyelids (Shields *et al.* 2005; Shields *et al.* 2004; Kass *et al.* 1989).

In our patients, all cases of SC (4 patients) in observed period were localized in the eyelid, 3 of them in the upper and 1 case in the lower eyelid. This is in compliance with data from the literature, where, as mentioned above, SC is considered to be a tumor most commonly localized in the upper eyelid.

The small sample size of patients with SC limits our findings on this tumor, but these were in general in compliance with literature data. According to the literature, the most affected age group are elderly people, especially in the age 60-80, even though SC was reported in age groups from 15 to 105 years. The ocular form of SC is more common in women (51-70%) (Wu *et al.* 2020).

This information is in compliance with our findings, as the age of our patients in the time of diagnosis was 24, 65, 72 and 75, with average value 59 years, which illustrates the tendency of SC to occur in higher age groups. In our findings, SC was more common in women, as 3 out of 4 patients with SC were female and 1 patient was a male.

CONCLUSION

Given the rare nature of sebaceous carcinoma of the eyelid, there is a limited number of studies concerning this area. In this article, we discussed the occurrence of this tumor in comparison with other eyelid carcinomas at Dept. of Ophthalmology, Comenius University and University Hospital Ružinov in Bratislava during 2-years long period. In compliance with scientific literature, we found sebaceous carcinoma to be the third most common eyelid malignant tumor, following basocellular and spinocellular carcinoma. We also found age and gender distribution of patients, as well as anatomic location of tumor to be in compliance with scientific literature. We believe greater awareness and

more evidence-based information on this area will lead to earlier recognition and improved treatment outcomes in the future.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest in connection with the published article.

FINANCIAL OR GRANT SUPPORT

This work was supported by grant KEGA 016UK - 4/2018.

LITERATURE

1. Buitrago W, Joseph AK (2008). Sebaceous carcinoma: the great masquerader. *Dermatologic Therapy* 2008; **21**(6):459–466. Doi: 10.1111/j.1529-8019.2008.00247.x.
2. Deprez M, Uffer S (2009). Clinicopathological Features of Eyelid Skin Tumors. A Retrospective Study of 5504 Cases and Review of Literature. *The American Journal of Dermatopathology* 2009; **31**(3): 256-262. Doi: 10.1097/DAD.0b013e3181961861.
3. Furdová A (2010). Nádory oka, orbity a adnexov. p. 807-848. In: Jurga LM *et al.* *Klinická a radiačná onkológia. 2.diel*. Martin: Osveta 2010. 1658 p. ISBN 978-80-8063-302-8.
4. Furdová A, Justusová P, Horkovičová K (2016). Maligne nádory mihalnic a vnútorného kútika oka. Bratislava: Univerzita Komenského 2016. 87 p. ISBN 978-80-223-4072-4.
5. Furdová A, Justusová P, Horkovičová K (2016). Možnosti epitetického riešenia defektov v oblasti tváre po liečbe nádorového ochorenia oka. *Zdravot. Soc. Práca* 2016; **11**(1): 22-29. ISSN: 1336-9326.
6. Furdová A, Kapitánová K, Sekáč J (2019). Vekom podmienené zmeny povrchu oka a epibulbárne nádory. *Zdravot. Soc. Práca* 2019; **14**(1):16-19. ISSN: 1336-9326.
7. Furdová A, Krčová I, Šramka M (2013). Súčasný stav evidencie nádorov oka na Slovensku. *Zdravot. Soc. Práca Suppl.* 2013; **8**(4): 39-40. ISSN: 1336-9326.
8. Furdová A, Lukačko P (2017). Periocular basal cell carcinoma predictors for recurrence and infiltration of the orbit. *The Journal of Craniofacial Surgery*

- 2017; **28**(1): 84-87. Doi: 10.1097/SCS.0000000000003242.
9. Furdová A, Macák D, Poruban D (2003). Karcinóm mihalnice vychádzajúci z Meibomovej žľazy. Česká a slovenská oftalmologie 2003;**59**(2):119-126. ISSN: 1805-4447.
10. Furdová A, Marková A, Zahorjanová P *et al.* (2018). Sociálne a psychologické problémy pacientov po radikálnych operáciách pre tumory v oblasti oka a očnice. Zdravot. Soc. Práca Suppl. 2018; **13**(3):144-146. ISSN: 2644-5433.
11. Furdová A, Zahorjanová P, Horkovičová K *et al.* (2015). Nádory kože mihalníc a vnútorného kútika-zdravotný aj sociálny problém. Zdravot. Soc. Práca Suppl. 2015; **10**:67-69. ISSN: 1336-9326.
12. Kass LG, Hornblase A (1989). Sebaceous carcinoma of the ocular adnexa. Survey of Ophthalmology 1989; **33**(6):477-490. Doi: 10.1016/0039-6257(89)90049-0
13. Kiyosaki K. *et al.* (2010). Analysis of p53 mutations and the expression of p53 and p21WAF1/CIP1 protein in 15 cases of sebaceous carcinoma of the eyelid. Invest Ophthalmol Vis Sci 2010; **51**(1):7-11. Doi: 10.1167/iovs.09-4127.
14. Knackstedt T, Samie FH (2017). Sebaceous Carcinoma: A Review of the Scientific Literature. Current Treatment Options in Oncology 2017; **18**(8): 1-13. Doi: 10.1007/s11864-017-0490-0.
15. Mráz P *et al.* (2006). Anatomia ľudského tela 2. (in Slovak). Bratislava: Slovak Academic Press 2006. Editio 2 (2.vydanie). 486 p. ISBN 80-89104-96-7.
16. Mulay K, Aggarwal E, White VA (2013). Periocular sebaceous gland carcinoma: A comprehensive review. Saudi J Ophthalmol 2013; **27**(3):159-165. Doi: 10.1016/j.sjopt.2013.05.002.
17. Nelson BR *et al.* (1995). Sebaceous carcinoma. Journal of the American Academy of Dermatology 1995; **33**(1):1-15. Doi: 10.1016/0190-9622(95)90001-2.
18. Owen JL *et al.* (2019). Sebaceous carcinoma: evidence-based clinical practice guidelines. The Lancet Oncology 2019; **20**(12):699-714. Doi: 10.1016/S1470-2045(19)30673-4.
19. Shields JA *et al.* (2004). Sebaceous carcinoma of the eyelids: Personal experience with 60 cases. Ophthalmology 2004; **111**(12):2151-2157. Doi: 10.1016/j.ophtha.2004.07.031.
20. Shields JA *et al.* (2005). Sebaceous Carcinoma of the Ocular Region: A Review. Survey of Ophthalmology 2005; **50**(2):103-122. Doi: 10.1016/j.survophthal.2004.12.008.
21. Wu A *et al.* (2020). Cutaneous sebaceous carcinoma. Australasian Journal of Dermatology 2020; 1-10. Doi: 10.1111/ajd.13234.
22. Xu Y *et al.* (2018). Updates on the clinical diagnosis and management of ocular sebaceous carcinoma: a brief review of the literature. OncoTargets and Therapy 2018; **11**: 3713-3720. Doi: 10.2147/OTT.S162073.

**DIFFERENT ANTI-VEGF AGENTS FOR THE TREATMENT
OF DIABETIC MACULAR EDEMA IN PATIENTS WITH WORSE BASELINE
VISUAL ACUITY – REAL WORLD EVIDENCE**

**RÔZNE ANTI-VEGF PREPARÁTY PRI LIEČBE DIABETICKÉHO EDÉMU
MAKULY U PACIENTOV S HORŠOU VSTUPNOU OSTROŠŤOU ZRAKU
– DÔKAZ Z REÁLNEJ KLINICKEJ PRAXE**

Pavol KUSENDA

Department of Ophthalmology, University Hospital – St. Michael's Hospital,
Bratislava, Slovakia

Contact address: MUDr. Pavol Kusenda, FEBO, Očné oddelenie, Univerzitná nemocnica – Nemocnica sv. Michala, a.s., Satinského 1, 811 08 Bratislava; e-mail: pavol.kusenda@gmail.com

ABSTRACT **Introduction and goal:** To determine whether there is a difference between the two drugs in the treatment of diabetic macular edema (DME) in patients with worse baseline BCVA (best corrected visual acuity) after one year of therapy.

Material and methods: Retrospective analysis - comparison between ranibizumab 0.5 mg and aflibercept 2.0 mg in patients with BCVA deterioration 68-35 letters due to DME. Comparison of changes in BCVA, macular central subfield thickness (CST), number of injections.

Results: 23 eyes (19 patients) - 13 eyes treated with ranibizumab, 10 eyes with aflibercept. Baseline CST 351.0 μm [334.5-442.0] (ranibizumab), 557.5 μm [441.8-615.8] (aflibercept), $P < 0.001$. CST after treatment 286.0 μm [256.5-337.0], 369.0 μm [309.0-595.0] respectively, $P = 0.014$. Improvement of BCVA (letters) +6.0 [2.0-12.5], +11.5 [9.0-15.3] respectively, $P = 0.054$. Number of injections 7.0 [4.5-8.5], 9.0 [9.0-10.0] respectively, $P = 0.002$.

Conclusions: No difference was found between ranibizumab and aflibercept in visual acuity gain and macular thickness reduction after the first year of treatment in patients with worse baseline visual acuity due to DME. In comparison to ranibizumab, patients treated with aflibercept had thicker baseline maculae and were treated with more injections.

Keywords: Diabetic macular edema, worse visual acuity, aflibercept, ranibizumab, first year of treatment

ABSTRAKT **Úvod a cieľ:** Zistiť, či sa v reálnej klinickej praxi prejaví rozdiel medzi dvoma liečebnými preparátmi pri liečbe diabetického edému makuly (DEM) u pacientov s horšou vstupnou NKZO (najlepšie korigovanou ostrosťou zraku) po roku terapie.

Materiál a metódy: Retrospektívna analýza ročnej liečby – porovnanie medzi ranibizumabom 0,5 mg a afliberceptom 2,0 mg u pacientov so zhoršením NKZO 68-35 písmen vplyvom DEM. Porovnanie zmien NKZO, hrúbky sietnice (CST), počtu injekcií.

Výsledky: Hodnotených 23 očí (19 pacientov) – z toho 13 očí liečených ranibizumabom, 10 očí afliberceptom. CST pred liečbou 351,0 μm [334,5-442,0] (ranibizumab), 557,5 μm [441,8-615,8] (aflibercept), $p < 0,001$. CST po liečbe 286,0 μm [256,5-337,0] (ranibizumab), 369,0 μm [309,0-595,0] (aflibercept), $p = 0,014$. Zlepšenie NKZO (písmená) po liečbe +6,0 [2,0-12,5] (ranibizumab), +11,5 [9,0-15,3] (aflibercept), $p = 0,054$. Počet injekcií za rok 7,0 [4,5-8,5] (ranibizumab), 9,0 [9,0-10,0] (aflibercept), $p = 0,002$.

Záver: U pacientov s horšou vstupnou NKZO následkom DEM nebol po roku liečby zistený rozdiel v zlepšení NKZO a redukcii CST medzi ranibizumabom a afliberceptom. Pacienti liečení afliberceptom mali oproti ranibizumabu väčšiu vstupnú hrúbku makuly a bol im podaný vyšší počet injekcií.

Kľúčové slová: Diabetický edém makuly, horšia ostrosť zraku, aflibercept, ranibizumab, prvý rok terapie

INTRODUCTION AND GOAL

Diabetes is one of the most common causes of blindness (Furdová *et al.* 2014; Horkovičová *et al.* 2015).

Retinal microvascular changes that occur in patients with diabetes are called diabetic retinopathy. Early clinical features of diabetic retinopathy include microaneurysms (MAs = abnormally dilated small vessels outpouchings), dot and blot hemorrhages, cotton wool spots and intraretinal microvascular abnormalities (IRMAs).

There are two main types of diabetic retinopathy - non-proliferative (NPDR) and proliferative (PDR). The main distinguishing feature between both is the presence (PDR) or absence (NPDR) of abnormal new blood vessels.

Based on observed ophthalmoscopic clinical features NPDR is further classified as mild (MAs only), moderate (two or more of the following – MAs, retinal hemorrhages, hard exudates), severe (any one of the following – 20 hemorrhages in each of the four quadrants, venous beading in 2 quadrants, IRMAs in one quadrant) or very severe (any two of the above features).

The progression of diabetic retinopathy severity is connected with capillary non-perfusion, which leads to retinal ischemia. Retinal ischemia causes upregulation of pro-angiogenic cytokines (mainly vascular endothelial growth factor – VEGF) that drive pathological intra-retinal and intravitreal neovascularization. Neovascularization occurs at the interface between perfused and nonperfused retina. These vessels are typically fenestrated, brittle and leaky which can result in vitreous hemorrhage (Lechner *et al.* 2017).

Diabetic macular edema (DME) is another serious and sight-threatening complication of diabetes. Basically, it is the retinal thickening of the central retina called macula, which is responsible for the sharpest vision. Accumulation of fluid at the macula can lead to the worsening of visual acuity or blindness without treatment. Pathophysiological, it results from the failure of the hemato-retinal barrier often occurring with altered ion homeostasis in Müller cells (Ford *et al.* 2013). Angiopoietin-like 4 (ANGPTL4) and VEGF destabilize retinal vascular barrier synergistically.

ANGPTL4 binds to neuropilin 1 (NRP1) and NRP2 on endothelial cells (ECs), leading to rapid activation of the RhoA/ROCK signaling pathway and the breakdown of EC-EC junctions. The ANGPTL4/NRP/RhoA pathway is a therapeutic target for the treatment of DME as well as the inhibition of VEGF (Sodhi *et al.* 2019).

Vision loss in patients with diabetic retinopathy results from maculopathy (macular edema and ischemia) and neovascularization of the retina (with resulting sequelae vitreous hemorrhage and retinal detachment) and iris (which leads to neovascular glaucoma) (Cheung *et al.* 2010).

Diabetic retinopathy is largely asymptomatic in the early stages. Regular eye screening for patients with diabetes is recommended as it enables timely diagnosis and subsequent management, which can prevent visual deterioration and blindness (Jones & Edwards 2010).

Basic diagnostic method for diabetic retinopathy and DME is ophthalmoscopic examination (Lim *et al.* 2013). In difficult conditions, with limited availability of technical equipment, it is also possible to perform ocular fundus examination using a smartphone and Volk lens (Furdová *et al.* 2016). Other widely used ancillary diagnostic methods are fluorescein angiography (FAG) and optical coherence tomography (OCT). The main role of FAG is to visualize the severity of diabetic retinopathy, to determine sites of leakage in macular edema, to judge the extent of capillary nonperfusion, and to confirm neovascularization. The OCT is a noninvasive imaging technique that accurately measures retinal thickness, demonstrates macular edema, and provides structural details of the macula. Optical coherence tomography is essential in management of DME – mainly because it quantifies the response of DME to the therapy (Lim *et al.* 2013).

The functional response of DME to the therapy is objectively determined by changes in visual acuity. Visual acuity in macular diseases (such as DME) is preferably tested by using ETDRS (early treatment diabetic retinopathy study) visual acuity charts. ETDRS charts are superior to Snellen charts, which are commonly used in clinical practice. ETDRS charts provide better test-retest variability (TRV). If visual acuity is tested multiple times, even in the absence of clinical change, in a real world there is difference

among results, which is called TRV. Classical Snellen charts have very large TRV – varying from ± 5 to 16.5 letters in normal subjects and up to 3.3 lines in cataractous, pseudophakic, or early stage glaucoma patients. Thus, a person can have up to a 3.5-line change in vision and this may not even represent true change, but chance. ETDRS charts were designed to provide the smallest TRV, which makes them more accurate (Kaiser 2009).

Possible treatment options for DME include laser therapy, anti-VEGF agents, steroids, vitreoretinal surgery and the treatment of diabetes (Schmidt-Erfurth *et al.* 2017).

The first line treatment of DME are intraocular injections of vascular endothelial growth factor inhibitors (anti-VEGF). There are currently 2 anti-VEGF drugs in this indication approved by the European Medicines Agency – ranibizumab 0.5 mg and aflibercept 2.0 mg.

Subanalysis of prospective, multicenter, randomized clinical study DRCR.net Protocol T found that patients with the baseline best-corrected visual acuity (BCVA) ≤ 68 letters due to DME treated with ranibizumab 0.3 mg achieved statistically significant lower visual acuity gains compared to the patients treated with aflibercept 2.0 mg after the first year of treatment.

There was no statistically significant difference in improvement of BCVA and treatment burden between both drugs after the second year of treatment (Wells *et al.* 2016).

The treatment of DME in Europe uses higher dose of ranibizumab (0.5 mg vs 0.3 mg) in contrary to DRCR.net Protocol T. There is a different dosing regimen of aflibercept in use as well (fixed vs defer and extend). Ranibizumab could be used in Europe in the same dosing regimen as in DRCR.net Protocol T (Eylea: EPAR - Medicine Overview, 2018; Lucentis : EPAR - Medicine Overview 2018; Wells *et al.* 2016). The goal of this work is to determine if there is a statistically significant difference between both drugs after the first year DME therapy in a real clinical setting in Slovakia.

MATERIAL AND METHODS

Retrospective analysis of one-year treatment results of patients with visual decline under 69 ETDRS (early treatment diabetic retinopathy study) letters due to DME with central macular involvement.

Comparison between intravitreally administered ranibizumab 0.5 mg and aflibercept 2.0 mg in a real clinical setting in patients with worse baseline visual acuity. Comparison of changes in BCVA, CST (central subfield thickness), treatment burden (number of injections) in the first year of treatment.

There were all patients included from the single department of ophthalmology (application center for anti-VEGF therapy):

- with treatment initiation in years 2013 – 2019,
- with documented treatment duration and observations for at least 1 year,
- whose medical records were not moved to archive (due to death),
- who all fulfilled the following inclusion and exclusion criteria.

Baseline BCVA 68-35 letters ($\sim 20/50 - 20/200$), CST ≥ 270 μm . Macular laser was allowed as early (before anti-VEGF) or deferred (not sooner than after 6 months of ranibizumab/aflibercept treatment).

The exclusion criteria were other eye diseases influencing BCVA, any previous anti-VEGF treatment, vitreomacular abnormality requiring surgical treatment and the need for steroid treatment.

Ranibizumab therapy started at the beginning with 3 monthly loading doses (every 4 weeks) with following injections administered as needed (pro re nata – PRN regimen), or in treat-and-extend (TREX) regimen, or defer and extend regimen (DAE = according to the clinical trial DRCR.net Protocol T).

Aflibercept therapy was administered in fixed dosing regimen – 5 monthly loading doses (every 4 weeks) followed with injections every 8 weeks.

Statistical data processing was performed in IBM SPSS Statistics version 25. Due to low parameter count and absence of normal distribution were parametric data compared with Mann-Whitney U test, nonparametric data with Chi-Quadrat test. Significant results were considered with $P < 0.05$.

RESULTS

There were 23 eyes (19 patients) included in cohort which fulfilled inclusion and exclusion criteria. There were 13 eyes from cohort treated with ranibizumab, 10 eyes with aflibercept. Treatment results with P values are available in Table 1.

There were no statistically significant differences in baseline visual acuity (BCVA) and macular laser ratio before treatment between ranibizumab and aflibercept. Baseline macular thickness (CST) was significantly higher in eyes treated with aflibercept.

There was no significant difference in BCVA and visual gain after the first year of treatment between drugs. No significant difference in macular thickness reduction after the first year of therapy was observed between ranibizumab and aflibercept. Maculae treated with aflibercept were significantly thicker even after the first year of treatment.

The treatment burden (number of injections) was significantly higher in patients treated with aflibercept.

Table 1: Treatment results. BCVA – best-corrected visual acuity in ETDRS letters, CST –central subfield thickness in μm . Values are expressed as arithmetic mean \pm standard deviation and median with interquartile range.

	Ranibizumab 0.5 mg (n=13)	Aflibercept 2.0 mg (n=10)	P value
BCVA before treatment	60.4 \pm 7.4 62.0 [53-67.5]	54.9 \pm 9.2 57.0 [46.8-62.0]	P=0.142
Proportion of eyes with macular laser before treatment (%)	38.5	30.0	P=0.673
CST before treatment	377.4 \pm 61.7 351.0 [334.5-442.0]	542.6 \pm 106.2 557.5 [441.8-615.8]	P<0,001
BCVA after treatment	67.7 \pm 7.2 68.0 [60.5-73.5]	67.0 \pm 8.4 69.0 [58.8-75.0]	P=0.834
CST after treatment	294.2 \pm 55.1 286.0 [256.5-337.0]	432.8 \pm 141.7 369.0 [309.0-595.0]	P=0.014
CST reduction after treatment	83.2 68.0 [45.0-140.0]	109.8 99.0 [0.0-229.5]	P=0.573
BCVA improvement after treatment	+7.3 6.0 [2.0-12.5]	+12.1 11.5 [9.0-15.3]	P=0.054
Number of injections / year	6.8 \pm 2.4 7.0 [4.5-8.5]	9.3 \pm 0.5 9.0 [9.0-10.0]	P=0.002

Figures 1 and 2 illustrate reduction of diabetic macular edema in a randomly chosen patient from the cohort who was treated with aflibercept – patient's BCVA improved by 9 letters

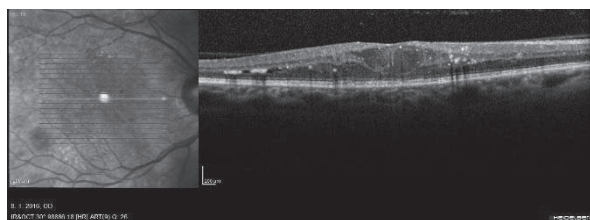


Figure 1. Diabetic macular edema before treatment (scan from optical coherence tomography)

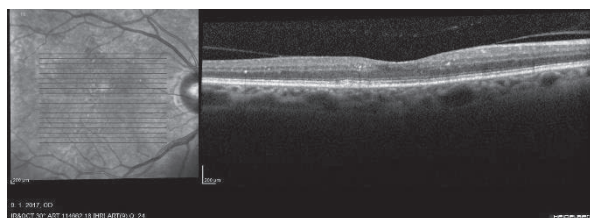


Figure 2. Resolution of diabetic macular edema after the one-year treatment with aflibercept (scan from optical coherence tomography)

DISCUSSION

In clinical study Protocol T DRCT.net patients with worse baseline visual acuity (≤ 68 letters) due to DME treated with aflibercept achieved significantly better visual gains than patients treated with ranibizumab after the first year of treatment (Wells *et al.* 2016).

My cohort shows no confirmation of aflibercept superiority in visual acuity improvement in a real clinical setting after the first year of treatment. Although aflibercept achieved higher numeric visual gains, it was just at the border of statistical significance (no significance was confirmed). I cannot rule out that appropriate increase in cohort size could lead to statistically significant difference.

In recently published prospective observational study with data from Fight Retinal Blindness! registry (authors from Australia, England, Switzerland, France and Italy) was observed statistically significant better visual acuity gain in patients treated with aflibercept 2.0 mg than ranibizumab 0.5 mg in a similar cohort after one year of treatment (Bhandari *et al.* 2020).

Prospective randomized study Protocol T DRCT.net was conducted in the USA – in Europe higher dose of ranibizumab and different dosing schedules of treatment drugs are used (Eylea: EPAR - Medicine Overview 2018; Wells *et al.* 2016).

Treatment regimen for aflibercept from Protocol T DRCT.net is not possible to use in Europe due to different approved dosing schedule. Those could be reasons for the different results.

The main limitation of my cohort is its size. It is a specific subgroup of patients with markedly worse initial visual acuity. Most patients with diabetic macular edema are detected and treated in our center at an earlier stage of the disease or due to their advanced disease (or too high glycated hemoglobin) they do not meet criteria for reimbursed treatment in Slovakia (in Protocol T DRCT.net the lowest visual acuity for treatment was $\sim 20/320$, 25 letters, in my cohort $\sim 20/200$, 35 letters) and therefore they cannot be treated

with ranibizumab or aflibercept. In addition, many patients with DME are not sufficiently compliant, they arbitrarily interrupt their treatment, or due to overall complications of diabetes and comorbidities they are not able to complete this time-consuming and frequent treatment completely.

For a significant increase in the number of patients included in cohort it would be necessary to conduct multicentric study (there were 89 participating centers in Protocol T).

Despite the absence of randomization in my cohort there was no significant difference in the baseline visual acuity between ranibizumab and aflibercept. There is no difference in percentual ratio of laser macular treatment as well, which is positive. Early macular laser (before anti-VEGF therapy) could namely decrease the potential visual gain during anti-VEGF treatment (Elman *et al.* 2015; Schmidt-Erfurth *et al.* 2017).

Significant difference in baseline macular thickness was found to the detriment of aflibercept group. It seems that in patients with thicker maculae our ophthalmologists tended to prefer aflibercept as a first-line drug. It is questionable whether a thicker maculae could have negatively affected the results of aflibercept treatment. In the Fight Retinal Blindness Registry! however, patients treated with aflibercept also had more thickened maculae than patients treated with ranibizumab and nevertheless achieved greater visual acuity gains (Bhandari *et al.* 2020).

In this context, a morphological evaluation of the outer plexiform layer (OPL) with optical coherence tomography and structural image from optical coherence tomography angiography (OCTA) for detailed evaluation of deep capillary plexus (DCP) would be interesting. Disturbance of OPL and DCP could be the predictor for response to anti-VEGF therapy (Lee *et al.* 2016).

The OCTA test is a relatively new examination method that became available in our department only recently, so I could not use it in these patients.

An interesting data from my group is also a significantly higher number of injections in eyes treated with aflibercept. This is in line with the recommended fixed dosing of aflibercept for diabetic macular edema in the first year of treatment (Eylea : EPAR - Medicine Overview, 2018). Ranibizumab can be dosed less intensively in DME depending on disease activity (Lucentis : EPAR - Medicine Overview 2018), which was reflected in my cohort, where patients achieved a comparable gain in visual acuity compared to aflibercept, despite the lower number of injections. Thus, there was no potential overtreatment. It is questionable whether a higher number of ranibizumab injections could result in higher visual acuity gains in this group. The tax for the lower number of

ranibizumab injections was the high number of follow-up examinations without drug application, but I did not evaluate this parameter.

CONCLUSION

No difference was found between ranibizumab and aflibercept in visual acuity gain and macular thickness reduction after the first year of treatment in patients with worse baseline visual acuity (≤ 68 letters) due to DME in a real clinical setting.

In comparison to ranibizumab, patients treated with aflibercept had thicker baseline maculae and were treated with more injections in the first year of treatment.

REFERENCES

1. Bhandari S, Nguyen V, Fraser-Bell S, Mehta H, Viola F, Baudin F, Gabrielle PH, Creuzot-Garcher C, Gillies M, Barthelmes D (2020). Ranibizumab or Aflibercept for Diabetic Macular Edema: Comparison of 1-Year Outcomes from the Fight Retinal Blindness! Registry. *Ophthalmology*. <https://doi.org/10.1016/j.ophtha.2019.11.018>
2. Cheung N, Mitchell P, Wong TY (2010). Diabetic retinopathy. *The Lancet*, **376**(9735): 124–136. [https://doi.org/10.1016/S0140-6736\(09\)62124-3](https://doi.org/10.1016/S0140-6736(09)62124-3)
3. Elman MJ, Ayala A, Bressler NM, Browning D, Flaxel CJ, Glassman AR, Jampol LM, Stone TW (2015). Intravitreal ranibizumab for diabetic macular edema with prompt versus deferred laser treatment: 5-year randomized trial results. *Ophthalmology* **122**(2): 375–381. <https://doi.org/10.1016/j.ophtha.2014.08.047>
4. Eylea : EPAR - medicine overview. (2018). https://www.ema.europa.eu/en/documents/overview/eylea-epar-medicine-overview_en.pdf
5. Ford JA, Lois N, Royle P, Clar C, Shyangdan D, Waugh N.(2013). Current treatments in diabetic macular oedema: Systematic review and meta-analysis. In *BMJ Open* (Vol. 3, Issue 3). BMJ Publishing Group. <https://doi.org/10.1136/bmj-open-2012-002269>
6. Furdová A, Furdová A, Krčméry V (2016). Využitie smartfónu ako zobrazovacej techniky pri vyšetrení očného pozadia pacientov v rámci misijných programov. *Zdravotníctvo a Sociálna Práca* 2016; **11**(1): 7–14.
7. Furdová A, Krčová I, Horkovičová K, Šramka M, Krásnik V (2014). Príčiny zrakového postihnutia a slepoty u diabetikov vo svete a na Slovensku. *Zdravotníctvo a Sociálna Práca* **9**(4, Suppl.): 40–42.
8. Horkovičová K, Popov I, Furdová A, Krásnik V (2015). Diabetes mellitus a jeho závažnosť pri

- zmenách na očnom pozadí. *Zdravotníctvo a Sociálna Práca* **10**(Suppl.): 81–83.
9. Jones S, Edwards RT (2010). Diabetic retinopathy screening: A systematic review of the economic evidence. In *Diabetic Medicine* (Vol. **27**, Issue 3, pp. 249–256). Blackwell Publishing Ltd. <https://doi.org/10.1111/j.1464-5491.2009.02870.x>
 10. Kaiser PK (2009). Prospective evaluation of visual acuity assessment: a comparison of snellen versus ETDRS charts in clinical practice (an AOS thesis). In *Trans Am Ophthalmol Soc* (Vol. **107**).
 11. Lechner J, O'Leary OE, Stitt AW (2017). The pathology associated with diabetic retinopathy. *Vision Research* **139**: 7–14. <https://doi.org/10.1016/j.visres.2017.04.003>
 12. Lee J, Moon BG, Cho AR, Yoon YH (2016). Optical Coherence Tomography Angiography of DME and Its Association with Anti-VEGF Treatment Response. *Ophthalmology* **123**(11): 2368–2375. <https://doi.org/10.1016/j.ophtha.2016.07.010>
 13. Lim JJ, Rosenblatt BJ, Benson WE (2013). Diabetic retinopathy. In M. Yanoff & J. Duker (Eds.), *Ophthalmology* (4th ed., pp. 541–550). Elsevier Inc.
 14. *Lucentis: EPAR - medicine overview*. (2018). https://www.ema.europa.eu/en/documents/overview/lucentis-epar-medicine-overview_en.pdf
 15. Schmidt-Erfurth U, Garcia-Arumi J, Bandello F, Berg K, Chakravarthy U, Gerendas BS, Jonas J, Larsen M, Tadayoni R, Loewenstein A (2017). Guidelines for the Management of Diabetic Macular Edema by the European Society of Retina Specialists (EURETINA). *Ophthalmologica* **237**(4): 185–222. <https://doi.org/10.1159/000458539>
 16. Sodhi A, Ma T, Menon D, Deshpande M, Jee K, Dinabandhu A, Vancel J, Lu D, Montaner S (2019). Angiopoietin-like 4 binds neuropilins and cooperates with VEGF to induce diabetic macular edema. *Journal of Clinical Investigation* **129**(11): 4593–4608. <https://doi.org/10.1172/JCI120879>
 17. Wells JA, Glassman AR, Ayala AR, Jampol LM, Bressler NM, Bressler SB, Brucker AJ, Ferris FL, Hampton GR, Jhaveri C, Melia M, Beck RW (2016). Aflibercept, Bevacizumab, or Ranibizumab for Diabetic Macular Edema Two-Year Results from a Comparative Effectiveness Randomized Clinical Trial. *Ophthalmology* **123**(6): 1351–1359. <https://doi.org/10.1016/j.ophtha.2016.02.022>

**A CASE STUDY OF THE APPLICATION OF HIPPO THERAPY
IN SCHOOL-AGE CHILDREN WITH MULTIPLE DISABILITIES**
**PŘÍPADOVÁ STUDIE APLIKACE HIPOTERAPIE U PACIENTŮ
ŠKOLNÍHO VĚKU S KOMBINOVANÝM POSTIŽENÍM**

Kristýna MIŠKOVSKÁ,¹ Markéta JANATOVÁ,²
Kateřina ČAPKOVÁ,¹ Martin VÍTEZNÍK²

¹ Centre for hippotherapy Mirákl, o.p.s. Bohuslavice 10, Telč, 588 56, Czech Republic

²Department of Information and Communication Technologies in Medicine,
Faculty of Biomedical Engineering, Czech technical university in Prague,
Studničkova 7, Praha 2, 128 00, Czech republic

Contact address: Markéta Janatová, Department of Information and Communication Technologies in Medicine,
Faculty of Biomedical Engineering, Czech technical university in Prague, Studničkova 7, Praha 2, 128 00, Czech
republic, +420 776 643 102, m.janatova@gmail.com

ABSTRACT **Introduction:** Hippotherapy is a physiotherapeutic method based on influencing the patient by three-dimensional mechanics of horseback movement. The method is used mainly in pediatric patients with various types of disabilities to improve motor and cognitive functions.
Aim: The aim of the study is to evaluate the effect of hippotherapy in children with multiple disabilities.
Material and methods: Within this case study, impact of hippotherapy on three school-age patients with multiple disabilities was observed. Heart rate was measured and recorded during the therapy and during the contact with the horse before and after the therapy. Prior to the study and after 6 weeks period, an examination was performed by physiotherapist.
Results: Significant drop in heart rate was observed in all three patients, corresponding with getting in the contact with the horse, getting on the horse and at the beginning of the ride. Heart rate raised again when the patient conducted active physical exercise. Based on the final examination improved body posture and gait was observed.
Conclusion: We verified in the scope of three cases that impact of hippotherapy on children can be assessed based on detecting changes in heart rate. Improvement in fields on which this therapy aims was observed.

Key Words: hippotherapy - heart rate – Down's syndrome - Prader-Willi syndrome - cerebral palsy

ABSTRAKT **Úvod:** Hipoterapie je fyzioterapeutická metoda, založená na ovlivnění pacienta třídímenzionální mechanikou pohybu koňského hřbetu. Metoda je využívána zejména u dětských pacientů s různým typem postižení s cílem zlepšit motorické i kognitivní funkce.
Cíl práce: Cílem studie bylo zhodnotit efekt hipoterapie u dětských pacientů s kombinovaným postižením.
Materiál a metodika: V rámci případové studie byl sledován vliv hipoterapie po dobu šesti týdnů na tři pacienty školního věku s kombinovaným postižením. V průběhu terapie i při kontaktu s koněm před a po terapii měřena tepová frekvence. Na začátku a po šesti týdnech bylo provedeno fyzioterapeutické vyšetření.

Výsledky: U všech tří pacientů bylo při kontaktu s koněm, po nasednutí na koně a při začátku jízdy na koni detekováno snížení tepové frekvence. Při zařazení aktivního cvičení došlo ke zvýšení tepové frekvence. V rámci kineziologického rozboru bylo zaznamenáno zlepšení zejména v oblasti vadného držení těla a chůze.

Závěry: V rámci tří kazuistik bylo ověřeno, že lze objektivně hodnotit vliv hipoterapie na dětské pacienty prostřednictvím detekce změn tepové frekvence. U pacientů bylo zjištěno zlepšení motorických funkcí v aspektech, na které je hipoterapie zacílena.

Klíčová slova: hipoterapie - tepová frekvence - Downův syndrom - Prader-Williho syndrom - dětská mozková obrna

INTRODUCTION

Paediatric patients with combined disabilities need continuous multidisciplinary rehabilitation intervention. In addition to conventional physiotherapy, ergotherapy, speech therapy and special needs education, physicians may also prescribe other complementary methods that have a proven positive effect on the patients and their families on the entire bio-psycho-social level. Hippotherapy led by a qualified specialist has benefits to the indicated patients on all these levels.

Hippotherapy is a form of equine-assisted physiotherapy, where physiotherapists use the horse-back as a dynamic tool, based on influencing the patient through the three-dimensional mechanics of horse-back movement. Impulses produced by the horse's back transmit desired rotations, deflections and tilts onto the patient. This movement results in reduced spasticity, among other things (Betachlová *et al.* 2016). The therapy consists of antigravity work, activation of balance reactions, posture, motor planning in motion, dynamization of the sitting position or other positions of the patient (Čapková *et al.* 2016). The positions are selected on the basis of the child's psychomotor stage of development, or according to the aim of the therapy, which can be focused on the quality or quantity of the motor development.

During the therapy, the patient receives proprioceptive, auditory, tactile, olfactory and visual stimuli that affect the psychophysiological state. The limbic system then controls the intensity of the mental and physical activities and the patient's response to the horse. The horse can also positively affect the patient's level of self-confidence and emotional expressions (Čapková *et al.* 2016).

Scientific studies have shown that hippotherapy has a positive impact on the balance, coordination of movement, increased muscle strength and reduction of spasticity (Angoules *et al.* 2015, Pantera *et al.* 2015, Hilliere *et al.* 2018; De *et al.* 2018). A positive effect of hippotherapy has been demonstrated in patients with cerebral palsy (Pantera *et al.* 2015). The effect of hippotherapy in children with Down's syndrome,

autistic spectrum disorders, delayed psychomotor development, or various types of musculoskeletal disorders is also being analysed (Angoules *et al.* 2015; De *et al.* 2018; Peters *et al.* 2017; Kraft *et al.* 2019).

The Centre for hippotherapy should have qualified staff and meet safety standards. Hippotherapy, including equine-assisted physiotherapy, occupational therapy, speech therapy, psychology, social work, learning, therapeutic riding and para-equestrian, can be used in both adult and child patients. It is possible to use special aids, such as fixed handles, which are especially suitable for the youngest patients who are already able to sit independently (Figure 1).



Figure 1. Firm handrails

The therapeutic horse should have flawless movement mechanics. Another important element for the safe performance of the therapy is that the horse should have a good character and be easy to control, so that the animal prioritises humans over its interests, similarly to, for example, assistance dogs (Čelko *et al.* 2018).

The duration and content of the therapy should always be adapted to the current condition of the individual patient (Betachlová *et al.* 2016). Hippotherapy also has contraindications, including inflammatory or febrile conditions, a higher degree of hip dislocation or scoliosis, pathological bone fragility, blood clotting disorders, atlanto-occipital instability,

manifest epilepsy, allergy to horse hair and fear of horses (Betachlová *et al.* 2016).

According to the methodology of hippotherapy for cerebral palsy approved by the Ministry of Health of the Czech Republic, hippotherapy can be prescribed to children from the 3rd month of age. Hippotherapy may be prescribed by a paediatrician, neurologist or rehabilitation physician as a neurophysiological method (code 21221) based on a physiotherapeutic prescription voucher.

A review of the literature aimed at the analysis of heart rate during hippotherapy has shown a beneficial effect of equine-assisted therapy on heart rate variability and a state of relaxation by activating the parasympathetic nervous system (García-Gómez *et al.* 2020).

AIM

The aim of this case study is to objectively evaluate the effect hippotherapy has on motor functions and heart rate changes during a therapeutic session.

MATERIAL AND METHODS

The effect of hippotherapy on paediatric patients was studied in three case studies for six weeks. The patients were informed in advance of the course of therapy and its possible risks and signed informed consent forms. The intervention took place in Centrum hiporehabilitace Mirákl, o.p.s., accredited by the Ministry of Health for a certified course of Hippotherapy for patients with cerebral palsy. The study complied with the ethical standards of the Declaration of Helsinki revised in 2013.

To objectively assess the immediate effect of the intervention on patients, heart rate was measured during the therapy and in contact with the horse before and after the therapy. The heart rate was measured using the Flexi Guard device designed at the Faculty of Biomedical Engineering of the Czech Technical University in Prague. The presence of physical activity was continuously detected by means of an accelerometric sensor. The course of therapy over time was recorded in a record sheet for ex-post evaluation of external influences on the heart rate.

Motor functions were evaluated on the basis of an initial kinesiological analysis, which included mainly a visual examination, palpation, goniometry, examination of muscle strength according to Janda and a neurological examination.

RESULTS

Case study 1

An 11-year-old boy with Down's syndrome has been undergoing equine-assisted physiotherapy once a week for a long time to improve muscle hypotension, poor posture, scoliosis, weakening of the abdominal muscles and balance disorders. The patient has protracted shoulders, increased lumbar lordosis and reduced lumbar spine mobility. The patient has compensated right concave scoliosis in the lower thoracic spine and generalised hypermobility. The aim of the therapy is to improve posture, motivate the boy to keep actively moving, eliminate scoliotic spine, improve the position in the shoulder joints and strengthen the abdominal muscles. The long-term goal is to prepare him for equine-assisted learning, social work and para-equestrian to improve the patient's physical condition and affect the psychosocial condition.

The patient's heart rate always decreased after mounting the horse, which indicates that the patient is calmed and relaxed during the therapy. During active exercise, the heart rate always increased, hence the exercise is clearly more physically demanding and requires increased patient concentration.

The maximum heart rate was 120 beats per minute. Upon contact with the horse (before mounting, during grooming, feeding, on the horse's back while stroking the horse) the heart rate always decreased, especially when it was preceded by agitation caused for other reasons.

The follow-up examination after the latest evaluated six-week therapy showed the release of the increased tension of the trapezius muscle and the improvement of the walking habit, when the patient began to use the joint movement of the upper limbs.

Case study 2

An eleven-year-old boy with a diagnosis of cerebral palsy and hyperkinetic syndrome has been attending long-term equine-assisted physiotherapy once a week. The patient has poor posture, protracted shoulders and slightly increased lumbar lordosis. The abdominal muscles are weak. The neurological examination shows that the patient has an increased muscle tone of all limbs, but without the presence of spasticity. Due to hypertension, the lower limbs have a slightly reduced range with active joint movement. The patient is not able to correctly process a larger amount of received sensory perceptions. During active movement, the patient has poorer coordination of movements, especially of the left half of the body.

The main goal of the therapy is to influence the patient's impaired ability to respond to external sensory stimuli, to improve the coordination of movements and

his poor posture. The patient already attends equine-assisted learning, social work and para-equestrian lessons. Through therapy, the patient comes into contact with peers and animals. These social interactions between all individuals also contribute to the psychosocial integration of the individual.

The patient has shown a decrease in heart rate and relaxation in direct contact with the horse from the ground or when riding. After the start of therapy, the heart rate usually does not remain below the value measured at rest for a long time. Clearly, the boy finds the therapy more demanding physically and in terms of concentration. During active follow-up exercise during the third monitored therapy, the patient's heart rate increased to 170 beats per minute (Figure 2). At the same time, at the end of the therapeutic session he was apparently becoming tired.

In other therapeutic sessions, a less difficult route was chosen and the walking speed of the horse was adjusted. After these modifications, fatigue no longer occurred and the heart rate reached a maximum of 140 beats per minute.

During the latest evaluated six-week therapy, there were no significant changes in the kinesiological examination, but in the long-term, there is a noticeable improvement in the stability and quality of walking. Responses to external stimuli have improved.

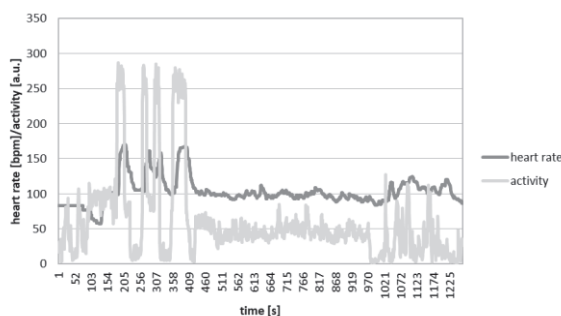


Figure 2: Heart rate and activity

Case study 3

A 12-year-old girl with Prader-Willi syndrome has been on equine-assisted physiotherapy once a week for a long time. The patient also attends equine-assisted learning, social work and para-equestrian lessons. These activities are beneficial for her not only physically but also psychosocially.

The patient is overweight and she has an android figure. There is muscle hypotension, poor posture and balance disorder. The patient has an increased kyphosis of the thoracic spine, slightly reduced mobility of the thoracic and lumbar spine and forward head posture. The patient has anterior pelvic tilt. There is a slight intention tremor on the upper limbs during targeted movements.

The therapy aims to improve the patient's poor posture and motivate her to move actively to maintain her overall physical condition and lose weight. Therefore, more difficult terrain and exercises are chosen for the patient so that she can engage in increased physical activity.

The heart rate proved to decrease during contact with the horse from the ground and during the therapy. This decrease was countered by an increase in heart rate when active exercise was added to the therapy or the patient became tired. The increase or decrease in heart rate was also affected by the patient's current emotional state caused by other factors. The maximum heart rate during the therapy was 122 beats per minute.

Within the latest evaluated six-week therapy, the patient showed improvements in posture defects, torso stabilisation, and balance.

DISCUSSION

A decrease in heart rate was detected in all three patients after mounting the horse and at the beginning of the ride. The measured values were around the lower limit of the physiological resting heart rate of 90 beats per minute. For these patients, riding a horse in walk is not difficult and contact with the horse causes relaxation. This makes us conclude that hippotherapy affects patients not only biomechanically, but also in other aspects, e.g. the emotional side (Čapková *et al.* 2016). This is a benefit of using the horseback as opposed to robotic technologies and simulators.

After the above-standard principles were added, in the form of active exercise, the relaxation was interrupted and the heart rate values corresponded to the increased physical activity. In hippotherapy, it is possible to use such principles in the form of active exercise, but this supplement to therapy is not suitable for all patients (Čapková *et al.* 2016). In the three patients in this article, it was desirable to choose active exercise.

The therapy must be adjusted to tailor an individual patient (Betachlová *et al.* 2016). In the patient in the second case, a higher heart rate was detected during the therapy with a higher level of difficulty. Based on this objective measurement, the difficulty was modified during subsequent therapy by changing the route and speed of the horse, which had a desirable effect on heart rate fluctuations.

According to a review of the literature focused on the monitoring of the heart rate during hippotherapy, equine-assisted physiotherapy was found to contribute to a state of relaxation (García-Gómez *et al.* 2020). Furthermore, patients in this case study experienced relaxation, while an increase in heart rates was detected only in connection with increased physical activity. A decrease in heart rate was also detected in all three

patients when in contact with the horse from the ground. It was noticeable that the patients calmed down even when they were agitated for other reasons when they came to the therapeutic session.

Influencing the psychological state and behavioural changes by contact with a horse is used also in other disciplines of hippotherapy, such as equine-assisted learning, social work, psychology and para-equestrian, which increase self-confidence and social contacts of the patients and their families.

According to the literature review, hippotherapy has a demonstrably positive effect on cerebral palsy in children (Pantera *et al.* 2015). The positive effect has also been investigated for other diagnoses, for some of which, for example for Down's syndrome, it is still necessary to perform a greater number of valid studies (De *et al.* 2018). Many factors and complex therapeutic interventions influence changes in motor functions. It is therefore impossible to determine to what extent the improvement is the result of hippotherapy. Objective measurement of physiological functions during the therapy can not only help to optimise the difficulty of the therapy, but also to objectify the effect hippotherapy has on patients.

CONCLUSIONS

The case studies verified that the effect of hippotherapy on paediatric patients can be objectively assessed by detecting changes in their heart rates. All patients demonstrated relaxation upon their contact with the horse and an increase in their heart rates during active exercise.

In all three patients, long-term improvement in motor function has been observed in the aspects in the focus of the hippotherapy. We can also see a positive psychosocial effect where patients, in addition to hippotherapy, also engage in para-equestrian sport and show their own initiative in horse-assisted learning and social work, thus improving their self-sufficiency in activities of everyday life.

CONFLICT OF INTEREST

We have no conflict of interest to declare.

LITERATURE

1. Angoules, G, et al., (2015). A review of efficacy of hippotherapy for the treatment of musculoskeletal disorders, *Br J Med Res*, 2015, 8, (2), 89-97.
2. Betachlová, M et al., (2016). Hipoterapie a její možnosti využití v rehabilitaci, *Rehabil. fyz. Lék*, 2016, 23, (3), 168-174.
3. Čapková, K, Pavlů, D, (2016). Možnosti hipoterapie u dětských pacientů s dětskou mozkovou obrnou, *Rehabil. fyz. Lék*. 2016; **23**(2): 114-118.
4. Čelko J, Gúth A (2018). Asistenční psi zlepšujú kvalitu života ľuďom so špeciálnymi potrebami, *Rehabilitácia* 2018; **55**(4): 203-214.
5. De M *et al.*, (2018). Effects of hypotherapy on the motor function of persons with Down's syndrome: a systematic review, *Revista de neurologia*, 2018; **67**(7): 233-241.
6. García-Gómez A *et al.* (2020). Equine-assisted therapeutic activities and their influence on the heart rate variability: A systematic review, *Complementary Therapies in Clinical Practice*, 2020, 101167.
7. Hilliere C *et al.* (2018). Benefits of Hippotherapy and Horse Riding Simulation Exercise on Healthy Older Adults: A Systematic Review, *PM&R*, 2018, **10**(10): 1062-1072.
8. Kraft *et al.* (2019). Hippotherapy in Rehabilitation Care for Children With Neurological Impairments and Developmental Delays: A Case Series, *Pediatric Physical Therapy*, 2019; **31**(1): 14-21.
9. Pantera E *et al.* (2015). Does hippotherapy improve motor function in children with cerebral palsy? Systematic review, *Annals of Physical and Rehabilitation Medicine* 2015; **58**: 139-143.
10. Peters B *et al.* (2017). Autism and equine-assisted interventions: a systematic mapping review, *Journal of autism and developmental disorders*, 2017; **47** (10): 3220-3242.

**APPLICATION OF THE METHOD OF SHORT INTERVENTION TO INCREASE
THE HEALTH LITERACY OF PATIENTS IN THE CZECH REPUBLIC
APLIKACE METODY KRÁTKÉ INTERVENCE PRO ZVÝŠENÍ ZDRAVOTNÍ
GRAMOTNOSTI PACIENTŮ VE ZDRAVOTNICKÝCH ZAŘÍZENÍCH
V ČESKÉ REPUBLICE**

Dagmar ŠKOCHOVÁ,¹ Jitka NĚMCOVÁ ²

¹ Faculty of Health Sciences, Center of Science and Research, Palacky University Olomouc,
General University Hospital, Prague, Czech Republic, dagmar.skochova@vfn.cz

² Medical College, Prague, Czech Republic, nemcova@vszdrav.cz

Contact address: PhDr. Dagmar Škochová, MBA, Všeobecná fakultní nemocnice v Praze, U Nemocnice 499/2,
128 08 Nové Město, e-mail: Dagmar.skochova@vfn.cz

ABSTRACT **Introduction:** Short interventions serve for increasing of health literacy and were applied at selected inpatients and outpatients in healthcare facilities in the Czech Republic in 2019.
The goal of the study: The goal of short interventions was the patients' education and motivating them to alter their health behaviour.
Material and methodics: Trained students identified lifestyle risk factors at patients recommended by their physician for the intervention with the help of questionnaires. Afterwards, they educated patients by means of illustrative cards. The patients filled then a questionnaire mapping the impact of interventions.
Results: 3905 patients were intervened. After intervention, 58,54 % smokers declared their intention to reduce their smoking, 21,60 % made a decision to stop smoking. The intention to reduce alcohol consume was stated by 45,13 % of intervened people, to a decision to stop alcohol consume came 20,23 % of patients. Altogether, 70,05 % of the patients intend to change their nutrition habits and 42,53 % decided to fundamentally change their eating habits. Altogether, 45,72 % of patients declared an intention and 37,06 % of patients have already made a decision to increase their physical activity.
Conclusions: The results give evidence about the positive impact of short interventions on educated patients.

Key words: Addiction. Short intervention method. Physical activity. Health literacy. Healthy nutrition.

ABSTRAKT **Úvod:** Krátké intervence slouží ke zvýšení zdravotní gramotnosti a byly aplikovány u vybraných hospitalizovaných a ambulantních pacientů ve zdravotnických zařízeních v České republice v roce 2019.
Cíl práce: Cílem krátkých intervencí bylo vzdělávání pacientů a jejich motivace ke změně jejich zdravotního chování.
Materiál a metodika: Vyškolení studenti identifikovali pomocí dotazníků rizikové faktory životního stylu u pacientů doporučených jejich lékařem k intervenci. Poté edukovali pacienty pomocí ilustračních karet. Pacienti pak vyplnili dotazník mapující dopad intervencí.
Výsledky: Edukováno bylo 3905 pacientů. Po intervenci 58,54 % kuřáků uvedlo svůj záměr omezit kouření, 21,60 % se rozhodlo přestat kouřit. Záměr omezit konzumaci alkoholu uvedlo 45,13 % intervenovaných lidí, k rozhodnutí abstinentovat dospělo 20,23 % pacientů. Celkem 70,05 % pacientů uvedlo úmysl změnit své stravovací návyky a 42,53 % se je již rozhodlo změnit radikálně. Celkem 45,72 % pacientů deklarovalo úmysl a 37,06 % pacientů se rozhodlo zvýšit svoji fyzickou aktivitu.
Závěry: Výsledky dotazníkového šetření přinášejí důkazy o pozitivním dopadu krátkých intervencí na edukované pacienty.

Klíčová slova: Metoda krátké intervence. Pohybová aktivita. Závislost. Zdravá výživa. Zdravotní gramotnost.

INTRODUCTION

It is still not possible to decrease diseases arising to a decisive extent from an unhealthy lifestyle in the Czech Republic. Lifestyle risk factors cohere with the development of a whole series of preventable chronic non-infectious (tumorous, cardiovascular) as well as metabolic (type 2 diabetes mellitus disease, obesity) diseases. Cardiovascular diseases take the first place in the causes of death in the long term in the Czech Republic – 50 % of population die of them, the second most abundant cause of death are neoplastic diseases, the incidence and the prevalence of type 2 diabetes mellitus arising clearly from obesity, unhealthy nutrition habits and low physical activity also dramatically increases. At the same time with the increasing number of lifestyle risk factors in the population, also macroeconomics losses increase on the basis of these risk factors. There are not only healthcare expenditures, higher losses grow as a result of a lower economic activity of ill inhabitants, decreased tax payments, costs of sick leaves, disability pensions, lower social security contributions and also so named presenteeism or working while sick can cause productivity loss. But at the same time, it is relative easy and cheap to influence lifestyle factors by education and by suitable interventional methods.

Students of the Medical College Prague studying the field of General Nursing who performed their practical training or worked in outpatient and inpatient medical facilities in the territory of the whole Czech Republic in the year 2019 intervened patients who endangered and affected their health voluntarily or because of lack of information. Information and advice given by general nurses stand a good chance to success at the patients because of their frequent mutual contacts. Also the authority and reputation of medical profession helps nurses to achieve a desirable effect (Mazalánová, Blažková 2010). It is possible to use the method of short interventions in primary, secondary as well as tertiary prevention in all kinds of healthcare facilities helps increase health literacy (Hrubá 2014). Health literacy implies the achievement of a level of knowledge, personal skills and confidence to take action to improve personal and community health by changing personal lifestyles and living conditions. Thus, health literacy means more than being able to read pamphlets and make appointments (WHO 1998).

METHODICS

Short interventions are defined practical processes which lead to an early identification of risk behaviour and recognition of the seriousness of the problem. They fulfil the requirement for low costs, easy availability and effectiveness and their principle is a general motivation principle with the goal of changing the person's behaviour. Short interventions in the field of lifestyle risk factors set the goal to recognize a real or potential problem with a lifestyle risk factor, to inform the patient about the result and to motivate him to change his behaviour. A motivational dialogue in the frame of a short intervention should take approximately 30 minutes, but also a very short intervention of 10 minutes can be effective. The method is effective in less serious problems above all. Professionals of the National Institute of Public Health prepared a manual and illustrative educational cards that in a simple way explain selected lifestyle risks and suggest suitable recommendations for their minimization.

International standardized questionnaires are used to evaluate the risk degree at the patient and the intervention effect – for evaluation of alcohol risk the questionnaire AUDIT, for evaluation of tobacco risk the Fagorström questionnaire, for evaluation of nutrition habits the questionnaire of the Institute of Preventive Medicine of Faculty of Medicine of Masaryk University in Brno in combination with the evaluation of the nutrition score according the WHO and for the evaluation of a physical activity is the questionnaire of the National Institute of Public Health used.

The training of the students of the Medical College Prague was performed in the form of interactive seminars in the frame of education. The seminars were prepared for 5 hours and splitted into 2 parts. The students were informed about lifestyle risk factors and chronic non-infectious diseases and the methodics of short interventions in the first theoretical part. The second part was focused on the practical training of interventions under the supervision of professionals from the National Institute of Public Health that is a professional guarantor of this activity. The trained students performed interventions at patients who were recommended by their physicians for the education in the course of the whole year 2019 and they entered each intervention into a nursing documentation.

The short questionnaire of the National Institute of Public Health was used for an objective evaluation. Interest in counselling or therapy and the degree of

motivation to change of the patients attitude and behaviour was evaluated from the gained data. Patients of inpatient healthcare facilities fulfilled the questionnaire with closed questions usually 2–3 days after the intervention, outpatient briefly after the education. The authors of this article are aware of the fact that particularly at outpatients the brief interval between an intervention and its evaluation could cause a higher effectiveness of the intervention. All questionnaires used in the frame of the intervention are available on the site of the National Institute of Public Health.

RESULTS

Short interventions were 2019 focused on main lifestyle risk factors of selected patients, namely smoking, alcohol abuse, insufficient physical activity and false diet.

Intervened pool included 3905 patients, thereof 1665 men (42,64 %) and 2240 women (57,36 %). Altogether, 512 (13,11 %) people were in the age category of 15-25 years, 913 (23,38 %) patients belonged to the category of 26-35 years, 1232 (31,55 %) to the category 36-55 years, 776 (19,87 %) in the category 56-65 years and 472 (12,09 %) patients were older than 65 years.

From the whole pool, 642 (16,44 %) respondents had primary, 2360 (60,44 %) secondary, 903 (23,12 %) tertiary education. Altogether, 2239 smokers were intervened, from which 1609 (41,20 %) belonged in the category of regular smokers, 630 (16,13 %) in the category of occasional smokers. The rest of the pool (42,66 %), that is 1666 patients, were non-smokers.

Total of 515 people declared they consumed alcohol regularly (13,19 %), 2058 (52,70 %) occasionally and 1332 people (34,11 %) in the pool did not consume alcohol at all. Most respondents came from a municipality with 2000 – 30 000 inhabitants (1190, 30,47 %), in a municipality over 30 000 inhabitants lived 1058 (27,9 %) patients and 1033 (26,45 %) respondents declared their residence in a metropolis.

The least numerous group of the pool formed 624 (15,98 %) patients from municipalities up to 2000 inhabitants. Following the evaluation through the questionnaire AUDIT the score 8-15 points characterizing risky alcohol drinking at 295 (49,00 %) patients, 16-19 points (harmful alcohol drinking) at 95 (15,78 %) people and more than 20 points, that is alcohol abuse, at 212 (35,22 %) patients, who were indicated for the intervention by physicians of inpatients or outpatients healthcare facilities and fulfilled the questionnaire AUDIT.

Altogether, 1592 respondents were indicated for the assignment of the nicotine addiction degree. Based on the evaluation results of the Fagerström questionnaire

922 (57, 91 %) people were inserted in the category strong nicotine addiction, 434 (27,26 %) in the category middle nicotine addiction, and a low nicotine addiction was found at 236 (14,82 %) of interviewed patients. 60,9 % (917 people) of the total number of 1526 patients who fulfilled the questionnaire dealing with their nutrition habits reached the point evaluation ranging from 0 to 5 points what signalizes diet of insufficient quality demanding changing on the basis of the performed intervention.

Approximately a third of patients of the pool (31,39 %), that is 479 patients, reached the evaluation of their nutrition habits in the range of 6-8 points what means the nutrition of a satisfactory quality, only with a proposal for minor adjustments. Only at 8,52 % people, it means 130 patients who were indicated by their treating physician for evaluating their diet, were evaluated as having an optimal diet. From 1135 respondents who were indicated for an evaluation of their physical activity 52,96 %, it means 707 people, had an insufficient physical activity, 30,34 % (405) respondents sufficient and only 16,7 % (223) people an optimal level of physical activity.

The questionnaire after the performed intervention regarding the nutrition habits, support of beneficial physical activity, elimination of smoking and decreasing of alcohol consume at intervened people included 4 same questions. The intention and the decision of a patient to change his/her behaviour on the basis of the intervention was mapped.

After smoking reduction interventions, 58,54 % intervened smokers declared their intention to reduce their smoking, 21,60 % made a decision to stop smoking. 16,52 % of intervened patients started considering a visit of smoking cessation counselling. 22,70 % of intervened patients considered the short intervention in the tobacco area as a breach of privacy.

After the performed intervention regarding the risk factor of alcohol overconsumption 45,13 % of intervened people declared after communicating the result of the AUDIT questionnaire the intention to cut back the consumption of alcohol, 20,23 % patients made a decision to stop consuming alcohol at all. On the basis of interventions, 12,99 % started considering a visit of a specialized counselling. Altogether, 24,5 % intervened people consider the education in the field of an alcohol overconsumption as a breach of privacy.

It was found out through the evaluation of the questionnaire “healthy nutrition” after a performed interventions in the field of nutrition habits, that 70,05 %, patients intend to change their nutrition habits, 42,53 % decided to fundamentally change their eating habits and 14, 36 % of patients started considering a visit of nutrition counselling. 17,0 % of intervened patients considered the short intervention in the field of nutrition habits as a breach of privacy

Altogether, 45,72 % of patients declared their intention to increase their physical activity, 37,06 % of patients have already made a decision to increase their physical activity and 7,73 % of all patients started considering a visit of physical activity counselling and for 14,6 % was the intervention a breach of privacy.

An existing relationship between sex, education and alcohol addiction was verified by chi-square test on the significance level equal to 5 %.

In the intervened pool of patients, a significantly higher alcohol consumption has been identified at men than women and the highest alcohol consumption identified as an alcohol addiction was typical for men with primary education. Furthermore, the existing relationship between the respondent age and their alcohol addiction was statistically proven whereby the highest alcohol addiction was typical for men aged 55-65 years.

The degree of tobacco addiction varied with regards to the sex and the completed education. The portion of male patients with a high tobacco addiction decreased with the increasing education level. Furthermore, the relationship between smoking and alcohol consumption was statistically proven. Altogether, 75,2 % patients with a strong tobacco addiction conceded also regular alcohol consumption. Also the presumption that men and women differ regarding the nutrition quality was verified, whereby better nutrition quality was found out at women. On the contrary, the presumption stating a statistical significant difference between men and women regarding their physical activity, was not proven. Particularly patients living in small municipalities with 2.000-30.000 inhabitants have an insufficient physical activity.

Table 1. Non-addiction chi-square test

	Test criterion	Critical value	Test result
Degree of alcohol addiction, education	55,589	12,592	Addiction
Degree of tobacco addiction, education	24,287	5,991	Addiction
Total score alcohol, sex	63,471	7,815	Addiction
Evaluation of nutrition, sex	10,773	5,991	Addiction
Evaluation of physical activity, sex	0,276	5,991	Non-addiction
Degree of tobacco addiction, sex, education	13,182	9,488	Addiction
Total score alcohol, age	34,116	21,026	Addiction
Degree of tobacco addiction, alcohol	33,484	9,488	Addiction
Evaluation of physical activity, residence	21,928	12,592	Addiction

Source: authors, 2020

DISCUSSION

The motivation part of interventions is the most difficult one and far from everybody who performs interventions, succeeds in it. The general nurse personality who performs the intervention, has to be accepted positive and with confidence. Therefore, a training of general nurses also in the field of communication competences is necessary (Mazalánová, Blažková 2010).

In the 80s of the 20th century in Canada, Sanchez-Craig and Wilkinson (1989) suggested a concept of short interventions as psychotherapy with the aim to motivate patients to change their alcohol consumption habits in a short time. This intervention was based on an empathic counselling style, that is a communication based on respect, understanding and sincere interest in the intervened person. Authors Bient, Miller and Tonigan (1993) concluded on the basis of 32 controlled studies including 6000 patients in the 90s that short interventions in the field of alcoholism can be considered equally effective as an extensive therapy. WHO published a handbook by Babor and Higgins-

Biddle (2001) in 2001 for using short interventions in primary care in the field of prevention of harmful alcohol consumption. This method was later successfully enlarged to other lifestyle risk factors. The short intervention method dealing with lifestyle risk factors is currently recognized as an internationally proven and financially viable prevention method with clear defined practical processes enabling an early identification of a risk behaviour that affects attitudes and behaviour in the population towards a healthy lifestyle. According to Maclagan, Park, Sanmartin *et al.* (2013) would successful interventions affecting most or all lifestyle risk factors decrease the incidence of cardiovascular diseases by 89 %, incidence of a stroke by 76 %, death rate from ischemic heart disease by 70 % and the incidence of malignant tumours by 51 %. According to Hrubá (2014) is a targeted and complexed approach in this primary prevention cheap and can in a substantial way reduce the number of chronically ill patients and prematurely dying people. Routine realization of preventive educational and interventional activities is not only a professional but also a moral duty of physicians and all healthcare professionals.

Hamplová and Pekara (2013) state that short interventions should be mostly used in healthcare facilities as a new way of education of population while supporting a healthy lifestyle. Miller and Sanchez (1994) affirmed already in the 90s the effectiveness of the approach of a single intervention (respectively with an offer of another consulting some weeks later) comparable to a time-consuming and professionally more demanding therapy in the case of alcoholism problems. Also Lindson-Hawley, Thompson and Begh (2015) provide evidence on benefits of a short intervention method in the field of smoking cessation provided by physicians and they emphasize the necessity of the length of the dialogue that should be shorter than 20 minutes, as a longer session uses to be less effective. On the basis of our experience we do agree with the affirmation of Aveyard, Begh, Parsons *et al.* (2012) who stress that healthcare professionals should aim their short interventions at all smokers, not only those, who are interested in an intervention. On the contrary, Alvarez-Bueno, Rodríguez-Martín, García-Ortiz *et al.* (2015) underscore a higher effectiveness at drinkers in the case of repeated interventions and they emphasize only a mild impact of short interventions on prevalence decrease in alcohol abuse in the population. According to their experience, effects of repeated 15minutes interventions persist at least over a 6-month period. It was not possible to follow the effect of the intervention over a 6-month period in the case of interventions realized in the course of students' practical training. On the basis of our experience we do not agree with the statement of Platt, Melendez-Torres, O'Donnell *et al.* (2016) pointing out that the environment interventions are performed in, has no substantial influence on their cumulative effect. Our experience shows that healthcare facilities represent a very suitable environment for short interventions. Works by Ballesterio, Gonzales-Pinto, Querejeta *et al.* (2004) bring very interesting results. They state that a short intervention of 5-15 minutes is effective in the case of decreasing alcohol consumption at risk drinkers regardless of the sex. In our pool, the intervention effectiveness regarding sex was not considered. Joseph, Basu, Danpanini *et al.* (2014) bring extraordinarily interesting and useful evidence in relation to interventions realised by general nurses. They state that short interventions performed by nurses can be considered as effective as interventions performed by physicians – an extremely important statement according to which short interventions should be included both into the education and the performed healthcare of general nurses all over the world. Lamming, Pears, Mason *et al.* (2017) state in the course of evaluating the effect of short interventions in the field of healthy physical activity habits that short interventions in this field can intensify the physical

activity of intervened people, but any long-term evidence is missing. They recommend to realize in this field in the primary care very short interventions of 5 minutes and less that are routinely very well performable and also cost-effective. Also Vijay, Wilson, Suhrcke *et al.* (2016) recommend on the basis of performed analysis short interventions supporting physical activities in the frame of the primary care and emphasize their financial viability compared with further healthcare. Contrary to our positive results Kuninkaanniemi (2018) found out only a mild effect of a short intervention aimed at changing eating habits at patients with a metabolic syndrome as well as a null effect on results of clinical examinations. We fully agree with the statement of Grossman, Bibbins-Domingo, Curry *et al.* (2017) that behavioural counselling in the field of healthy nutrition and physical activity for prevention of cardiovascular diseases is suitable also at people without risk factors thus far.

CONCLUSIONS

Overall, it was found from questionnaires after the performed intervention that an average success rate of an intervention, that means a decision to change a lifestyle, was 12-40 % in depending on a communicated risk factor and a personal approach of an intervening person. As the most difficult issue appears the intervention in the field of tobacco addiction (smoking), patients/clients are opened for a change in a field of physical activity and nutrition. Short interventions realized at inpatients and outpatients in medical facilities in the whole Czech Republic in 2019 can be evaluated as very successful. Altogether, 226, it means 22,46 % of all intervened patients in the field of alcohol abuse, considered the intervention as a breach of privacy. 361 (22,80 %) of intervened patients in the field of smoking considered the short intervention as a breach of their privacy, too. The same approach to the intervention took 260 patients (17,04 %) intervened in the field of healthy nutrition and 193 (14,46 %) patients in the field of physical activity, despite the fact that they were ill people, who were generally supposed to be preventable through a healthy lifestyle. On the basis of our experience it is necessary to constantly increase the health literacy and to reinforce the patients' responsibility for their own health including those who have no risk factors so far.

DECLARATION

Authors of the manuscript titled: "Application of the method of short intervention to increase the health literacy of patients in the Czech Republic" certify:

Ethical requirements according to the Helsinki Declaration were complied with during the interventions.

This manuscript has not been published nor is under simultaneous consideration for publication elsewhere. The final form of the manuscript has been seen and approved by authors.

The interventions were not financially supported by a grant in 2019.

No conflict of interest.

Author's share: Škočková 90%, Němcová 10%.

LITERATURE

1. Álvarez-Bueno C, Rodríguez-Martín B, García-Ortiz L, Gómez-Marcos MÁ, Martínez-Vizcaíno V (2015). Effectiveness of brief interventions in primary health care settings to decrease alcohol consumption by adult non-dependent drinkers: a systematic review of systematic reviews. *Prev Med.* 2015; **76** Suppl: 33-38. Doi: 10.1016/j.ypmed.2014.12.010
2. Aveyard P, Begh R, Parsons A, West R (2012). Brief opportunistic smoking cessation interventions: a systematic review and meta-analysis to compare advice to quit and offer of assistance. *Addiction.* 2012; **107**(6): 1066-73. Doi:10.1111/j.1360-0443.2011.03770.x
3. Babor TF, Higgins-Biddle JC (2001). *Brief Intervention for Hazardous and Harmful Drinking. A Manual for Use in Primary Care.* Geneva: World Health Organisation. 2001. [online] [cit.2020-05-22]. Available from <https://apps.who.int/iris/handle/10665/67210>
4. Ballesteros J, Gonzalez-Pinto A, Querejeta I *et al.* (2004). Brief interventions for hazardous drinkers delivered in primary care are equally effective in men and women, *Addiction.* 2004; **99**: 103-108. [online] [cit.2020-05-04]. Available from <https://doi.org/10.1111/j.1360-0443.2004.00499.x>
5. Bertholet N, Daeppen JB, Wietlisbach V *et al.* (2005). Brief alcohol intervention in primary care: systematic review and meta-analysis. *Arch Intern Med.* 2005; **165**: 986-995. [online] [cit.2020-05-24]. Available from <https://doi.org/10.1001/archinte.165.9.986>
6. Bient H, Miller WR, Tonigan JS (1993). Brief interventions for alcohol problems: a review. *Addiction.* 1993; **88**:315-335. Doi: 10.1111/j.1360-0443.1993.tb00820.x
7. Grossman DC, Bibbins-Domingo K, Curry SJ *et al.* (2017). Behavioral Counselling to Promote a Healthful Diet and Physical Activity for Cardiovascular Disease Prevention in Adults without Cardiovascular Risk Factors: US Preventive Services Task Force Recommendation Statement. *JAMA.* 2017; **11**; **318**(2): 167-174. Doi: 10.1001/jama.2017.7171
8. Hamplová L, Pekara J (2013). Nové trendy v edukaci obyvatel ke zdravému životnímu stylu. In: *Zborník medzinárodnej vedeckej konferencie Univerzity J. Selyeho - 2013.* Komárno: Univerzita J. Selyeho, 2013: 443-448. [CD-ROM]. ISBN 978-8122-073-9.
9. Hrubá D (2014). Strategie primární prevence. *Medicína pro praxi.* 2014; **11**(3):120-123. ISSN 1214-8687.
10. Joseph J, Basu D, Dandapani M *et al.* (2014). Are nurse-conducted brief interventions (NCBIs) efficacious for hazardous or harmful alcohol use? *Int Nurs Rev.* 2014; **61**:203-10. Doi: 10.1111/inr.12096
11. Kuninkaanniemi H (2018). *Brief Interventions in Counselling for Nutrition and the Prevalence of Metabolic Syndrome in Primary Care Adult Patients.* Dissertations, Jyväskylä. University of Jyväskylä, Finland. 2018. ISBN 978-951-39-7582-1.
12. Lammings L, Pears S, Mason D *et al.* What do we know about brief interventions for physical activity that could be delivered in primary care consultations? *Prev Med.* 2017; **99**:152-163. Doi: 10.1016/j.ypmed.2017.02.017
13. Lindson-Hawley N, Thompson TP, Begh R. Motivational interviewing for smoking cessation. *Cochrane Database of Systematic Reviews.* 2015; 2(Issue 3). Art. No.: CD006936. Doi: 10.1002/14651858.CD006936.pub3.
14. MacLagan LC, Park J, Sanmartin L *et al.* The CANHEART health index: a tool for monitoring the cardiovascular health of the Canadian population. *CMAJ.* 2013; Doi: 10.1503/cmaj.131358.
15. Mazalánová A, Blažková V (2010). *Výchova ke zdraví v práci sestry v 21. století.* In: *Zdraví a péče o člověka v 21. století.* Plzeň: Západočeská univerzita, 2010. ISBN 978-80-7043-908-1.
16. Miller WR, Sanchez VC (1994). Motivating young adults for treatment and lifestyle change, in: *Issues in Alcohol use and misuse by young adults.* France, Notre Dame: University of Notre Dame Press. 1994. ISBN 0-268-00641-5.
17. O'Donnell A, Anderson PD, Newbury-Birch D *et al.* (2014). The impact of brief alcohol interventions in primary healthcare: a systematic review of reviews. *Alcohol* 2014; **49**(1): 66-78. doi: 10.1093/alcalc/agt170
18. Platt L, Melendez-Torres GJ, O'Donnell A *et al.* (2016). How effective are brief interventions in reducing alcohol consumption: do the setting,

- practitioner group and content matter? Findings from a systematic review and metaregression analysis. *BMJ Open*. 2016; 11; 6(8): e011473. Available from: <http://dx.doi.org/10.1136/bmjopen-2016-011473>
19. Sanchez-Craig M, Wilkinson DA (1989). Brief treatments for alcohol and drug problems: Practical and methodological issues. In: *Addictive Behaviours: Prevention and Early Intervention*. Netherlands, Amsterdam, Lisse: Swets and Zeitlinger, B.V. 1989:233-252. [online] [cit.2020-04-12]. Available from: <https://doi.org/10.1111/j.1360-0443.1990.tb03068.x>
20. Vilaj GCV, Wilson EC, Suhrcke M *et al.* (2016). VBI Programme Team. Are brief interventions to increase physical activity cost-effective? *Br J Sports Med*. 2016; 50(7): 408-17. Doi: 10.1136/bjsports-2015-094655
21. WHO. Health Promotion Glossary. Geneva. 1998. [online] [cit.2020-04-14]. Available from <https://www.who.int/healthpromotion/about/HPR%20Glossary%201998.pdf?ua=1>

**PARENTAL INFLUENCE ON THE PHYSICAL ACTIVITY OF ADOLESCENTS:
SYSTEMATIC REVIEW OF CURRENT SCIENTIFIC EVIDENCE**
**VPLYV RODIČOV NA FYZICKÚ AKTIVITU ADOLESCENTOV:
SYSTEMATICKÝ PREHĽAD SÚČASNÉHO STAVU VEDECKÉHO POZNANIA**

Michaela KOSTIČOVÁ¹, Eva DOBIÁŠOVÁ¹, Jaroslava KOPČÁKOVÁ²

¹Institute of Social Medicine, Faculty of Medicine, Comenius University in Bratislava

²Department of Health Psychology and Research Methodology, Faculty of Medicine, P.J.
Safarik University in Kosice

Contact address: MUDr. Michaela Kostičová, PhD, MPH, Univerzita Komenského v Bratislave, Lekárska fakulta, Ústav sociálneho lekárstva a lekárskej etiky, Sasinkova 2, 813 72 Bratislava, Slovenská republika, e-mail: michaela.kosticova@fmed.uniba.sk, tel: +421 2 9011 9427, mobil: +421 903 262 706

ABSTRACT Introduction: Physical activity is important for child healthy growth and development. Physical activity decreases with child age, mainly during adolescence, when children have become independent from parental influences.

Aim: to explore and understand how parents can positively influence the physical activity of healthy adolescents.

Methods: We conducted umbrella review to synthesize the evidence from the existing systematic reviews published in electronic databases MEDLINE - Pubmed, Epistemonikos and Cochrane Database of Systematic Reviews in 2009-2019. Narrative synthesis method was used to synthesize the evidence.

Results: We identified 40 systematic reviews and nine of them were included in the qualitative analysis: four examined the parental influences on adolescents' physical activity and five analyzed the effectiveness of interventions involving parents. We found that parents could have positive influence on adolescent's physical activity. Emotional support, by encouraging adolescents to be physically active, was the most important form of support together with the role of the father as a model of physical activity.

Conclusion: Parents play an important role in promoting children's physical activity even during adolescence. Interventions to support physical activity in adolescents should focus on education of parents about the importance of physical activity and training of social skills to support and motivate adolescents to perform physical activity.

Key words: physical activity – healthy lifestyle – education – adolescents – parents – systematic review – studies

ABSTRAKT Úvod: Fyzická aktivita je dôležitá pre zdravý rast a vývin detského organizmu. So stúpajúcim vekom klesá fyzická aktivita u detí a to najmä v období adolescencie, kedy dochádza k osamostatňovaniu detí spod vplyvu rodičov.

Cieľ: Cieľom práce je poskytnúť systematický prehľad najnovších vedeckých poznatkov o úlohe rodičov v podpore fyzickej aktivity u zdravých adolescentov.

Metodika: Metodikou systematického prehľadu typu "umbrella review" sme sumarizovali poznatky prezentované v štúdiách typu systematický prehľad publikované v elektronických databázach MEDLINE – Pubmed, Epistemonikos a Cochrane Database of Systematic Reviews v období rokov 2009-2019. Na syntézu poznatkov bola použitá metodika naratívnej syntézy.

Výsledky: Identifikovali sme 40 štúdií typu systematický prehľad, do kvalitatívnej analýzy sme zaradili deväť z nich: štyri skúmali vplyv rodičov na fyzickú aktivitu adolescentov a päť analyzovalo efektívnosť intervencií s účasťou rodičov. Zistili sme, že rodičia môžu pozitívne vplývať na rozvoj fyzickej aktivity adolescentov, aj keď v menšej miere ako u mladších detí. Ako významná sa ukazuje predovšetkým psychická podpora zo strany rodičov a to vo forme povzbudzovania k vykonávaniu fyzickej aktivity a tiež úloha otca ako vzoru fyzickej aktivity.

Záver: Rodičia zohrávajú významnú rolu v podpore fyzickej aktivity u detí aj v období adolescence. Intervencie na podporu fyzickej aktivity u adolescentov by mali byť zamerané na edukáciu rodičov o význame fyzickej aktivity a nácvik sociálnych zručností na podporu a motiváciu adolescentov k vykonávaniu fyzickej aktivity.

Kľúčové slová: fyzická aktivita – zdravý životný štýl – edukácia - adolescenti – rodičia – systematický prehľad - štúdie

INTRODUCTION

Regular physical activity supports healthy child growth and development, positively affects the mental health and cognitive functions of children and adolescents and reduces the risk of morbidity in later life (Bielik 2017). According to the World Health Organization, physical inactivity is the fourth most common risk factor for mortality in the world and contributes significantly to the overall burden of diseases (World Health Organization, 2010). The amount of physical activity has been decreasing throughout the life cycle, but especially during adolescence. For children aged 6-18 years, experts recommend a minimum of 90 minutes of moderate physical activity or 60 minutes of vigorous physical activity per day (Bielik *et al.* 2017; World Health Organization 2010). According to the results of the Health Behavior in School-aged Children (HBSC) study, less than one third of Slovak boys and less than a quarter of Slovak girls aged 11-, 13- and 15- years met these recommendations in 2018 (Madarasova Geckova 2019). Evidence suggests, that boys are more physically active than girls during adolescence, the amount of physical activity decreases with increasing age, and adolescents from families with higher socioeconomic status are more physically active (Bauman *et al.* 2012; Inchley *et al.* 2016; Kopcakova, 2018). It has been also found, that patterns of physical activity are transmitted from childhood to adulthood, and parents have a significant influence on shaping their children's attitudes and behaviors in relation to physical activity (Dobbins *et al.* 2013; Trost *et al.* 2013). Moreover, peers and other important people from around children and adolescents also play a key role (Bandura 1977). Regular physical activity of parents and best friend influences the quantity, quality and regularity of adolescents' physical activity (Bakalar *et al.* 2019). The attitudes of parents to physical activity and their emotional support and

motivation of children to perform physical activity seems to be important factors as well (Barr-Anderson *et al.* 2013; Beets *et al.* 2010; Edwardson & Gorely, 2010). However, the transition from childhood to adolescence is marked by greater autonomy of children and a decrease in influence of parents on children's behavior including physical activity (Kader *et al.* 2015). The aim of the work is, based on the systematic review of current scientific evidence, to examine and understand how parents can positively influence the physical activity of healthy adolescents.

METHODS

We conducted a systematic review of studies published over the last 10 years (2009-2019). We searched for systematic reviews, which in the context of Evidence Based Research and Evidence Based Medicine represent studies with the hierarchically highest level of evidence (Clarke 2011; Howick *et al.* 2011; Lund *et al.* 2016). We used the umbrella review methodology, which summarizes and synthesizes findings from existing systematic reviews and thus provides a comprehensive and effective overview of the information available on the topic (Aromataris *et al.* 2017). The results are presented according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Electronic databases MEDLINE - Pubmed, and Epistemonikos (database of systematic reviews) and the database Cochrane Database of Systematic Reviews (Ovid EBM) were searched for existing published systematic reviews. The studies were included in the final analysis when meeting the following criteria: systematic review types studies, focusing on healthy adolescents aged 13-18 years, examining the behavior, attitudes and influences of parents on children's physical activity, published in English, Slovak or Czech language. The measurement of physical activity could be subjective - using questionnaires, or objective - using pedometers

and accelerometers. Narrative reviews, protocols of systematic reviews, studies focusing on adolescents younger than 13 years old, adolescents with health problems, ethnic minorities, studies that examined physical activity in relation to non-parental characteristics were not included in the final analysis. Following combination of terms were used for search strategy: “parent*”, “family”, “relatives”, “physical

activit*”, “physical exercise*”, “physical training*”, “adolescent*”, “child*”, “youth”, “teen”. Narrative synthesis was used to analyze the studies meeting the inclusion criteria. The quality of systematic reviews was assessed using The Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Systematic Reviews and Research Syntheses criteria.

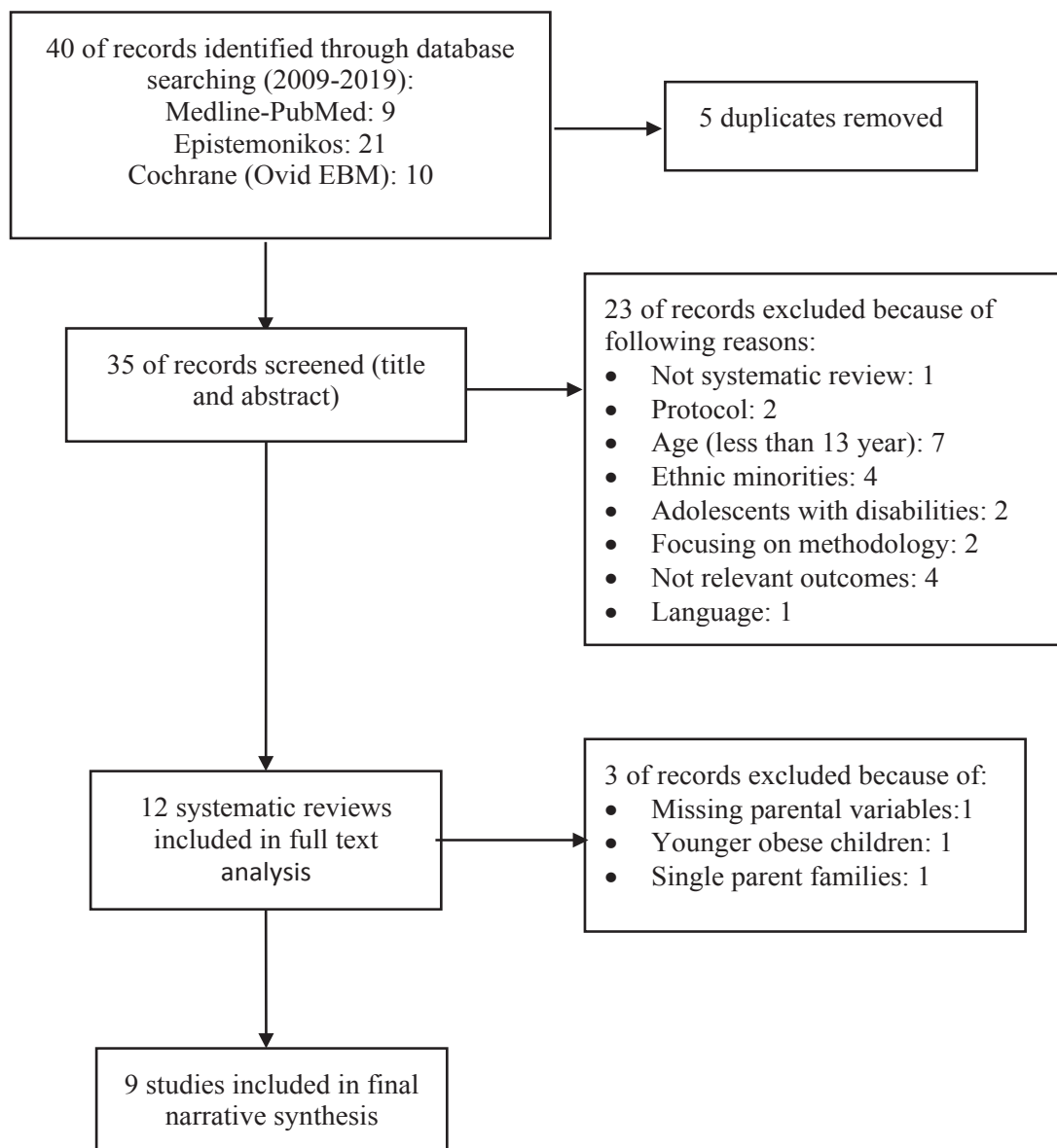


Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) search strategy flow chart

RESULTS

Search strategy

The search strategy is presented in Figure 1. We identified 40 studies, nine in PubMed database, 21 in Epistemonikos database and 10 in Cochrane database of systematic reviews. Five duplicates were excluded. Further 23 studies, which did not meet the inclusion criteria or were irrelevant to our research question, were excluded after the screening of the title and abstract of the study. Full text analysis was performed in 12 systematic reviews and three more systematic reviews were excluded. One systematic review focused on younger obese children, the second review examined the effectiveness of school intervention to promote physical activity without parental involvement and the third one analyzed physical activity of children from single parent families. Nine systematic reviews were included in final narrative synthesis

Narrative synthesis of evidence

The overview of systematic reviews included in narrative synthesis is presented in Tables 1 and 2. Table 1 presents characteristics of four systematic reviews examining the parental influences on physical activity of adolescents (Beets *et al.* 2010; Edwardson & Gorely 2010; Hutchens & Lee 2018; Yao & Rhodes 2015). Table 2 presents characteristics of five studies analyzing the effectiveness of interventions with parental involvement on physical activity of adolescents (Dellert & Johnson 2014; Kader *et al.* 2015; O'Connor *et al.* 2009; Van Lippevelde *et al.* 2012; van Sluijs *et al.* 2011).

According to the JBI criteria for assessing the quality of systematic reviews, not all studies were systematic reviews and none of the reviews had a registered protocol in the systematic review database. We have decided to include all reviews published according to PRISMA guidelines in narrative synthesis and will refer to them as systematic reviews (SRs). Two SRs analyzed only randomized controlled trials (Van Lippevelde *et al.* 2012; van Sluijs *et al.* 2011), the other SRs analyzed studies regardless their study design. Meta-analysis were conducted only in two SRs (Dellert & Johnson 2014; Yao & Rhodes 2015).

A total of 450 primary studies were analyzed within all SRs: 121 within the SRs examining the effectiveness of interventions with parental involvement, and 329 within the SRs analyzing the influence of parents on the physical activity of adolescents. We focused on SRs published in the last 10 years (2009-2019), which analyzed data from primary studies published in the period 1980-2017.

Regarding the age of the respondents, all SRs included the sample of children of different age. The number of primary studies including adolescents 13 to 18-year-old is given in Tables 1 and 2. Only 28 primary studies out of a total of 121 studies examining the effectiveness of interventions with parents engagement focused on adolescents and only some of them examined interventions in relation to physical activity.

Parental influence on physical activity of adolescents

Following parental variables were studied in SRs examining the parental influences on adolescents' physical activity":

1. Parent as a model of physical activity: physical activity of parents, joint physical activities of parents and children;
2. Intangible support: motivation and encouragement of adolescents to perform physical activity, informing about the benefits of physical activity; doing activities with children and the supervision of children during physical activity;
3. Tangible support: financing of physical and sports activities, purchasing equipment, transportation, registration of children for sports activities

All four SRs (Beets *et al.* 2010; Edwardson & Gorely 2010; Hutchens & Lee 2018; Yao & Rhodes 2015) confirmed a positive association between parental support and adolescent physical activity. More physically active adolescents perceived more support from their parents than their less physically active peers. The most significant impact was psychological support in the form of encouragement to perform physical activity, other forms of support were less effective. Beets *et al.* (2010) a Edwardson and Gorely (2010) pointed to the declining impact of the importance of support from parents with the increasing age of the child and the onset of the importance of support from peers during adolescence. Yao and Rhodes (2015) did not find any age differences and Hutchens and Lee did not examine the age differences (2018). A positive association decreasing with age was found also between parental and children physical activity. The role of fathers as models of physical activity proved to be particularly important, even in the age group of adolescents. When interpreting the results of SRs, it is necessary to take into account the cross-sectional design of the primary studies, which were mostly of low or medium quality and were based on subjective questionnaire measurements.

Table 1. Characteristics of systematic reviews examining influence of parents on adolescent's physical activity

Authors, date	N° of primary studies, years	Age	Parental variables	Results
Beets et al., 2010	N=80 1970-2008	0- 18 years	<i>Intangible social support:</i> (motivational—encouragement and praise—and informational—discussing benefits of PA <i>Tangible social support:</i> instrumental purchasing equipment/payment of fees and transportation—and conditional—doing activity with and watching/supervision	Positive association between adolescents' physical activity and parental social support - support and encouragement to PA had the most significant effect. Adolescents who had physically active fathers were more physically active. The influence of parents decreases during adolescence, support from peers begins.
Edwardson and Gorely, 2010	N=96 -2009	6 -18 years 55 studies - adolescents	PA of parents, parent as a model, encouragement, transportation, financing, attitudes of parents to PA, doing activity with, watching/supervision, registration for PA	Positive association between physical activity of adolescents and support (mental and material) from parents. Adolescents who had PA fathers were more physically active. The influence of parents on PA of adolescents is smaller than in children
Hutchens and Lee, 2018	N=38 1998-2017	3-18 years 6 studies - adolescents	PA of parents, parent as a model, encouragement, transportation, financing. doing activity with children	PA activity was higher in children who had physically active parents and their parents provided them with logistics in connection with sports activities. Quality of studies was low or medium, mostly cross-sectional studies. Age differences were not discussed.
Yao and Rhodes, 2015	N=115 1970-2014	2,5-18 years 47 studies – adolescents	PA of parents, parent as a model, encouragement, transportation, financing, attitudes of parents to PA, doing activity with, watching/supervision, registration for PA, purchasing equipment/payment of fees	Positive association between children's physical activity and support (mental and material) from parents. Encouragement to PA had the most significant impact, other forms were not effective. No age differences were identified. Weak positive association was found between PA of parents and PA of children, most significant was between father and son PA, which decreased with child age.

PA¹ – physical activity

Table 2. Characteristics of systematic reviews examining the effectiveness of interventions involving parents on adolescent's physical activity

Author s, date	N° of primary studies, years	Age	Intervention	Results
Dellert and Johnson , 2013	N=36 1990- 2011	5-18 years 6 studies – adolescents, 3 studies- PA ¹	Education about PA and nutrition, motivation of children to PA, common PA with children	Interventions targeting children's PA activity have been shown to have small effect, if targeted only to children alone had no effect. Interventions to improve PA in adolescents are more effective when both parents and children are involved. It is not clear what form of intervention is most appropriate for adolescents.
Kader et al., 2015	N=35 1990- 2013	2-18 years 5 studies – adolescents, 15 studies- PA	face-to-face counselling, group education, information sent home, and telephone counselling	There is limited evidence for the effectiveness of parental interventions to increase PA in children, Interventions were more effective in younger than older children. The effect was significant if the interventions lasted for a long time (min. 6 months). Individual consultations had a weak positive effect. Sending educational materials home was not effective.
O'Conn or, et al., 2009	N=35 1980- 2008	-18 years 7 studies - adolescents	face-to-face and telephone counselling, education of parents, common PA with children	Due to the high heterogeneity and low quality of the studies, no conclusions can be drawn. Interventions are generally not effective. Individual consultations had a weak positive effect. Sending educational materials home was not effective.
Van Lippeve lde et al., 2012	N=5 1990- 2010	6-18 years 4 studies - adolescents	Educational materials for parents, school events for both parents and children, interactive meetings, home PA together	There is a lack of evidence to support the claim that parental involvement is important to improve effectiveness of school-based behavioural nutrition and physical activity interventions, Despite the small number of studies, a combination of different types of parenting strategies appears to be more effective than just one type of intervention.
van Sluijs et al., 2011	N=10 2007- 2010	-18years 6 studies – with parental involvement, 1 study - adolescents	Education of parents	Despite the higher quality of evidence, there is no evidence that intervention with parental involvement have a positive effect on PA of adolescents. Although, there is weak evidence about the effectiveness in younger children, it is not clear what type of intervention is effective.

PA¹ – physical activity

Effectiveness of interventions with involvement of parents

The importance of parental involvement in interventions to promote the physical activity of children and adolescents was examined in five SPs (Table 2). Two of them analyzed intervention studies

that focused only on physical activity (O'Connor *et al.* 2009; van Sluijs *et al.* 2011). In addition to physical activity, three SRs examined the effectiveness of interventions in relation to the weight and / or eating habits of children and adolescents. (Dellert & Johnson 2014; Kader *et al.* 2015; Van Lippevelde *et al.* 2012).

Following types of interventions were identified:

1. Individual form – face to face or telephone consultations;
2. Group form - lectures, workshops;
3. Written form - sending information materials home;
4. Joint physical activities of parents with children - at home, at school, in the community.

Results of all SRs showed, that due to the high heterogeneity and low quality of primary studies, there is not enough evidence suggesting the effectiveness of interventions with parental involvement to promote physical activity in children and adolescents. Dellert and Johnson (2014) found that interventions are more effective when both parents and children are involved, no effect was found for interventions involving just children. Sluijs *et al.* (2011) came to similar conclusion, moreover, they found that interventions are more effective in younger compare to older children. Kader *et al.* (2015), who examined the effectiveness of interventions in relation to children's eating habits, weight and physical activity, found that interventions were effective in young children only if they lasted for a long time, at least six months. Regarding the form of the intervention, face to face consultations with parents had a weak positive effect and the sending of educational materials home were not effective. These finding were also confirmed by O'Connor *et al.* (2009). According to Van Lippevelde *et al.* (2012), who examined the importance of parental involvement in school obesity intervention programs, a combination of several intervention strategies was more effective than just one type of intervention.

DISCUSSION

The aim of this study was to systematically examine and synthesize the latest scientific evidence about the role of parents in supporting the physical activity of adolescents. We found that parents can have a positive effect on the promotion of physical activity in adolescents, although to a lesser extent than in younger children. Psychological support from parents in the form of encouragement to perform physical activity proves to be the most important. It also turns out that physically active parents can have a positive effect on the promotion of physical activity of adolescents. The role of the father as a model of physical activity in children and adolescents seems to be especially important. There is insufficient evidence that interventions involving parents are effective to promote physical activity in adolescents.

Our findings are in line with the findings of other studies. According to a systematic review by a consortium of experts from 12 European countries

called DETERminants of DIET and Physical Activity (DEDIPAC), adolescents who received more support from parents and friends, mainly in the form of encouragement for physical activity or joint performing physical activity were more physically active (Jaeschke *et al.* 2017). According to the authors, support and encouragement from parents increase adolescents' self-confidence and belief in the ability to perform physical activity, which in turn affects their motivation, attitudes and behavior to physical activity. Adolescents themselves also perceive support and recognition from parents, as well as friends and teachers, as an important factor that influences their motivation and attitudes to physical activity (Kopcakova *et al.* 2015; Martins *et al.* 2015). Although the influence of peers increases in adolescence, parents continue to play an important role in shaping the physical activity of adolescents. The results of the SOPHYA study confirmed our findings that adolescents' physical activity is positively associated with parental physical activity, which may be either potential sustained effect of role modelling at a younger age through the establishment of a social norm regarding physical activity later in life or a persistent influence of parents' physical activity behaviour even in adolescents (Bringolf-Isler *et al.* 2018). According to our findings, the role of the father as a model of physical activity proves to be important, which was also confirmed by other studies from Slovakia. (Bakalar *et al.* 2019; Madarasova Geckova *et al.* 2000).

CONCLUSION

We have found, based on the systematic review of the latest scientific evidence, that parents play an important role in the promotion of physical activity even in adolescence. Through their support, encouragement and modeling, parents can positively influence the motivation and behavior of adolescents in relation to physical activity. Therefore, it is necessary to promote the physical activity not only in children, but also in their parents. The lack of regular physical activity, in the context of the health of adolescents, indicates the need to apply effective strategies and interventions to promote regular physical activity at a young school age, both at school (eg active breaks) and out of school (eg active transport, offer and availability of sports leisure activities). It is also important to increase awareness of the importance of physical activity among parents and to practice social skills how to support and motivate adolescents to perform physical activity. Despite the lack of evidence on the effectiveness of intervention with involvement of parents, the results suggest that interventions should be differentiated according to age of children. and take into account the specific needs and psychosocial

characteristics of adolescents.

ACKNOWLEDGEMENTS

This work was supported by the Slovak Research and Development Agency under the Contract no. APVV-18-0070 “Generácia Z - nové výzvy dospievania”.

CONFLICTS OF INTEREST

Authors declare no conflicts of interest.

REFERENCES

1. Aromataris E, Ritin Fernandez Godfrey C, Holly C, Khalil H & Tungpunkom P (2017). Chapter 10: Umbrella Reviews. In *Joanna Briggs Institute Reviewer's Manual*. In: Aromataris E, Munn Z (Editors). The Joanna Briggs Institute. <https://reviewersmanual.joannabriggs.org/>
2. Bakalar P, Kopčáková J & Madarasova Geckova A (2019). Association between potential parental and peers' correlates and physical activity recommendations compliance among 13-16 years old adolescents. *Acta Gymnica* **49**(1): 16–24. <https://doi.org/10.5507/ag.2018.027>
3. Bandura A (1977). *Social Learning Theory*. Prentice Hall.
4. Barr-Anderson DJ, Adams-Wynn AW, DiSantis KI & Kumanyika S (2013). Family-focused physical activity, diet and obesity interventions in African-American girls: a systematic review: Family interventions in African-American girls. *Obesity Reviews* **14**(1): 29–51. <https://doi.org/10.1111/j.1467-789X.2012.01043.x>
5. Bauman AE, Reis RS, Sallis JF, Wells JC, Loos, RJ & Martin BW (2012). Correlates of physical activity: why are some people physically active and others not? *The Lancet* **380**(9838): 258–271. [https://doi.org/10.1016/S0140-6736\(12\)60735-1](https://doi.org/10.1016/S0140-6736(12)60735-1)
6. Beets MW, Cardinal BJ & Alderman BL (2010). Parental Social Support and the Physical Activity-Related Behaviors of Youth: A Review. *Health Education & Behavior* **37**(5): 621–644. <https://doi.org/10.1177/1090198110363884>
7. Bielik V (2017). Zhoršovanie telesnej zdatnosti detí a mládeže nemá vplyv len na športový výkon. *Pediatrica Pre Prax* **18**(3): 96–98.
8. Bielik V, Hamar D, Penesová A, Babjaková J, Antalá B, Labudová J & Kovács L (2017). Odporúčania pre pohybovú aktivitu detí a mládeže na Slovensku (6–18 rokov). *Česko-Slovenská Pediatrie* **72**(6): 377–381.
9. Bringolf-Isler B, Schindler C, Kayser B, Suggs LS & Probst-Hensch N (2018). Objectively measured physical activity in population-representative parent-child pairs: parental modelling matters and is context-specific. *BMC Public Health* **18**(1). <https://doi.org/10.1186/s12889-018-5949-9>
10. Clarke J (2011). What is a systematic review? *Evidence-Based Nursing* **14**(3): 64–64. <https://doi.org/10.1136/ebn.2011.0049>
11. Dellert JC & Johnson P (2014). Interventions with Children and Parents to Improve Physical Activity and Body Mass Index: A Meta-Analysis. *American Journal of Health Promotion* **28**(4): 259–267. <https://doi.org/10.4278/ajhp.120628-LI T-313>
12. Dobbins M, Husson H, DeCorby K & LaRocca RL (2013). *School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6 to 18*. 262.
13. Edwardson CL & Gorely T (2010). Parental influences on different types and intensities of physical activity in youth: A systematic review. *Psychology of Sport and Exercise* **11**(6): 522–535. <https://doi.org/10.1016/j.psychsport.2010.05.001>
14. Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, Liberati A, Moschetti I, Phillips B & Thornton H (2011). *The 2011 Oxford CEBM Evidence Levels of Evidence (Introductory Document)*. Oxford Centre for Evidence-Based Medicine. <https://www.cebm.net/index.aspx?o=5653>
15. Hutchens A & Lee RE (2018). Parenting Practices and Children's Physical Activity: An Integrative Review. *The Journal of School Nursing* **34**(1): 68–85. <https://doi.org/10.1177/1059840517714852>
16. Inchley J, Currie D, Young T, Samdal O, Torsheim T, Augustson L, Mathison F, Aleman-Diaz AY, Molcho M, Weber MW, Barnekow V & World Health Organization (Eds.). (2016). *Growing up unequal: gender and socioeconomic differences in young people's health and well-being: Health Behaviour in School-Aged Children (HBSC) Study: international report from the 2013/2014 survey*. World Health Organization Regional Office for Europe.
17. Jaeschke L, Steinbrecher A., Luzak A, Puggina A, Aleksovska K, Buck C, Burns C, Cardon G, Carlin A, Chantal S, Ciarapica D, Condello G, Coppinger T, Cortis C, De Craemer M, D'Haese S, Di Blasio A, Hansen S, Iacoviello L, ... Pischon T (2017). Socio-cultural determinants of physical activity across the life course: a 'Determinants of Diet and Physical Activity' (DEDIPAC) umbrella systematic literature review. *International Journal of Behavioral Nutrition and Physical Activity* **14**(1). <https://doi.org/10.1186/s12966-017-0627-3>

18. Kader M, Sundblom E & Elinder LS (2015). Effectiveness of universal parental support interventions addressing children's dietary habits, physical activity and bodyweight: A systematic review. *Preventive Medicine* 77: 52–67. <https://doi.org/10.1016/j.ypmed.2015.05.005>
19. Kalman M, Madarasová Geckova A, Hamřík Z, Kopčáková J, Ianotti RJ & Dankulincova Veselská Z (2015). Motives for Physical Activity among Adolescents in the Czech and Slovak Republics. *Central European Journal of Public Health* 23(Supplement): S78–S82. <https://doi.org/10.21101/cejph.a4176>
20. Kopcakova J (2018). *Physical activity, screen-based activities and their potential determinants. Active living during adolescence*. Rijksuniversiteit Groningen.
21. Kopcakova J, Dankulincova Veselska Z, Madarasova Geckova A, Kalman M, van Dijk J P & Reijneveld SA (2015). Do Motives to Undertake Physical Activity Relate to Physical Activity in Adolescent Boys and Girls? *International Journal of Environmental Research and Public Health* 2015; 12(7):7656–7666. <https://doi.org/10.3390/ijerph120707656>
22. Lund H, Brunnhuber K, Juhl C, Robinson K, Leenaars M, Dorch BF, Jamtvedt G, Nortvedt MW, Christensen R & Chalmers I (2016). Towards evidence based research. *BMJ* i5440. <https://doi.org/10.1136/bmj.i5440>
23. Madarasova Geckova A (2019). *Sociálne determinanty zdravia školákov. Národná správa o zdraví a so zdravím súvisiacom správaní 11, 13 a 15-ročných školákov na základe prieskumu uskutočneného v roku 2017/2018 v rámci medzinárodného projektu „Health Behaviour in School-aged Children“ (HBSC)*. Úrad verejného zdravotníctva Slovenskej republiky.
24. Madarasova Geckova A, Pudelsky M & van Dijk JP (2000). Vplyv rodičov na fajčenie, konzumovanie alkoholu a športovanie adolescentov. *Česká a Slovenská psychiatrie* 2000; 8: 406–410.
25. Martins J, Marques A, Sarmiento H & Carreiro da Costa F (2015). Adolescents' perspectives on the barriers and facilitators of physical activity: a systematic review of qualitative studies. *Health Education Research* 2015; 30(5), 742–755. <https://doi.org/10.1093/her/cyv042>
26. O'Connor TM, Jago R & Baranowski T (2009). Engaging Parents to Increase Youth Physical Activity. *American Journal of Preventive Medicine* 2009; 37(2): 141–149. <https://doi.org/10.1016/j.amepre.2009.04.020>
27. Trost SG, McDonald S & Cohen A (2013). Measurement of General and Specific Approaches to Physical Activity Parenting: A Systematic Review. *Childhood Obesity* 9(s1), S-40-S-50. <https://doi.org/10.1089/chi.2013.0027>
28. Van Lippevelde W, Verloigne M, De Bourdeaudhuij I, Brug J, Bjelland M, Lien N & Maes L (2012). Does parental involvement make a difference in school-based nutrition and physical activity interventions? A systematic review of randomized controlled trials. *International Journal of Public Health* 2012; 57(4): 673–678. <https://doi.org/10.1007/s00038-012-0335-3>
29. van Sluijs EMF, Kriemler S & McMinn AM (2011). The effect of community and family interventions on young people's physical activity levels: a review of reviews and updated systematic review. *British Journal of Sports Medicine* 45(11): 914–922. <https://doi.org/10.1136/bjsports-2011-090187>
30. World Health Organization (2010). *Global recommendations on physical activity for health*. World Health Organization.
31. Yao CA & Rhodes RE (2015). Parental correlates in child and adolescent physical activity: a meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity* 12(1): 10. <https://doi.org/10.1186/s12966-015-0163-y>

**LIMITS AND POSSIBILITIES OF MANAGEMENT OF SOCIAL SERVICES
RELATED TO THE PERFORMANCE OF CERTAIN
PROFESSIONAL ACTIVITIES LIMITED**
MOŽNOSTI MANAŽMENTU SOCIÁLNYCH SLUŽIEB
SPOJENÝCH S VÝKONOM NIEKTORÝCH ODBORNÝCH ČINNOSTI

Marcel TÓTH

Discipline of Social work, St. Elizabeth University of Health and Social sciences,
University of Bratislava, Slovak Republic

Contact address: PhDr. Bc. Marcel Tóth, Kozmonautov 4, 900 21 Svätý Jur, Slovakia; marafuta@gmail.com.

ABSTRACT **Introduction:** Nursing and residential homes facility ought to maintain a current, correct, and reliable record of the medication prescribed and given to a resident. The right use of a drug chart will meet this demand. We tend to restrain the difficulty during which we tend to specify that nursing and residential homes facility ought to maintain a current, correct, and reliable record of the medication prescribed and given to a resident.

Objective: The aim of the work was to specify the right use of a drug chart. The hard-copy of Nursing and Residential homes Medication Chart aims to supply a typical kind for the prescription, dispensing, and administration of medication.

Methodology: The partial objectives embody a comprehensive record in drug use that ought to facilitate communications between health professionals.

Results: Medication record charts (medication administration charts MAR) cut back the danger of prescribing, dispensing, and administration errors through the standardized presentation of medicines info for a person patient. It conjointly standardizes the method medicines info is bestowed all told bad attention settings.

Conclusion: supported observe results, we tend to finish that benefits of Medication records charts or a minimum of a series of best observe principles for the planning and use of a drugs Chart, comes from having a bigger awareness that the prescribing method may end up in direct patient damage and bigger awareness of the methods and processes to minimize this damage.

Keywords: Medication record charts, nursing, and residential home, nurse

ABSTRAKT **Úvod:** Zariadenia sociálnych služieb by mali viesť aktuálny, presný a spoľahlivý záznam o predpísaných liekoch a ich podávaní klientom/pacientom. Správne použitie liekovej schémy môže splniť túto požiadavku. Zaoberali sme sa otázkou, v ktorej uvádzame, že zariadenia sociálnych služieb by mali viesť aktuálny, presný a spoľahlivý záznam o liekoch predpísaných a poskytovaných klientovi/pacientovi.

Cieľ: Cieľom práce bolo špecifikovať správne použitie liekovej schémy. Zariadenia sociálnych služieb a liekové záznamy majú za úlohu poskytnúť štandardnú formu v rámci predpisovania, vydávania a podávania liekov.

Metodika: Medzi čiastkové ciele patrí úloha komplexných záznamov o užívaní liečiv, ktoré by mal uľahčiť komunikáciu medzi zdravotníkmi pracovníkmi.

Záver: Na základe výsledkov z praxe sme dospeli k záveru, že výhody záznamov o liekoch alebo aspoň série zásad osvedčených postupov pri navrhovaní a používaní liekovej schémy vychádzajú z väčšej informovanosti o tom, že process predpisovania môže mať za následok priame poškodenie pacienta a tým sa zvyšuje väčšie povedomie o stratégiách a procesoch na

minimalizovanie tohto poškodenia.

Kľúčové slová: Liekový záznam, zariadenia sociálnych služieb, sestra.

INTRODUCTION

medication administration chart in an exceedingly nursing or residential home as a communication tool between doctors, nurses, pharmacists, alternative health care professionals and hospitals concerning a resident's/patients medicines. It's wont to direct however and once medication square measure to be administered and as a record of their administration.

Ensuring a resident Associate in Nursing exceedingly in a very} residential or the institution receives the most effective medical aid correctly and safely could be an advanced method involving several health professionals together with doctors, pharmacists, and nurses. One vital task of this method is that the communication of the prescription to permit safe and correct dispensing and administration. This communication is created safer if elements of these communication process the square measure created with a stronger understanding of assorted safety principles and with some standardization of those processes to minimize the chances of accidental any medication errors.

Unlike somebody's home, wherever he or she administers his or her own medicines, medicines in social services square measure sometimes managed by employees, though shoppers retain the correct to administer their own medicines if attainable. Drug management could be an advanced associate decreed complex method and represents an underestimated and necessary component of the resident's care. It an intensive method and has been shown to account for up to 40-50% of employees' time in social services facilities (Allred *et al.* 2009).

A medication administration chart in an exceedingly residential and nursing homes could be a safe communication tool between doctors, nurses, pharmacists, and alternative health care professionals and hospitals concerning a resident's medication. It's wont to direct however and once medication square measure to be administered and as a record of their administration by qualified nurses/staff.

Standards principles for medication management in nursing and residential facilities a square measure that social services ought to guarantee all residents have a current, correct, and reliable record of all medicines elect, prescribed, administered, and used, to support safe prescribing and administration. The proper use of an associate degree befittingly designed medication administration the chart is demand.

Most nursing facilities use proprietary written medication charts accessible from industrial printers,

aged-care service company's versions from agencies whose charts square measure ready to be written on the website or from pill pusher.

Drug management is one in all the foremost necessary functions for workers in social services facilities, nurses/qualified employees perform this role. There square measure sometimes four cycles of medication per day that in most cases coincides with the client's time for supper (8:00, 12:00, 16:00, and 20:00). Generally speaking, one worker can run a drug delivery cycle that may last anyplace between half-hour and 2 hours reckoning on the number of shoppers and the number of medicine administered in every facility (Allred *et al.* 2009). The delivery of medicines in social care facilities has become a lot of complicated over the last forty years thanks to the growing range of medicines and coverings offered to treat purchasers with progressively complicated conditions and comorbidities. Medications square measure equipped by totally different completely different} pharmaceutical firms and should have different brands and packaging, that will increase the complexness of drug administration (Edwards 2015).

ISSUES WITH THE MEDICATION ADMINISTRATION CHARTS IN RESIDENTIAL OR NURSING

Homes proprietary written charts utilized in nursing and residential homes square measure typically multiple-page booklets designed to last for periods of up to 6 months. Whereas patients, doctors, nurses, and pharmacist's square measure typically co-located in hospitals and might physically use a similar chart, this cannot be the case in nursing and residential facilities. Their differing locations lead to all work eager to be traced and faxed or shared electronically between the power, doctors, and pharmacists. The multiple-page book format of the charts utilized in controlled care complicates sending a comprehensive record of a resident's current treatments.

A drug is equipped to the residents of nursing and residential facilities in original packs distributed by a pill roller and tagged with directions for administration or equipped in dose administration aids (Figure 1 and 2). These aids could also be filled with one drug per pack (unit dose) or with a variety of medicine thanks to being at the same time administered to the resident (multi-dose). Whereas dose administration aid has become commonplace in nursing and residential facilities, not all prescription drugs are packed along thanks to the formulation, stability, or restrictive

restraints. This often ends up in the employment of parallel provide systems for original packs, and dose administration aids.

All jurisdictions need a registered or registered nurse to be accountable for the medication given in a very nursing and residential facility. However, in some circumstances trained nursing assistants/ NVQ Level three are able to facilitate residents to self-administer medicines. If equipped in an artless pack, the nurse United Nations agency administers a drug is needed to verify it against the doctor's order, choose the proper amount, and record the administration on the MAR chart. If the drug is equipped in a very dose administration aid, the staffer United Nations agency assists a resident to self-administer or the United Nations agency administers the contents should sign for doing therefore while not the responsibility of distinctive every drug. Medication charts got to be able to accommodate these variations in packaging, and therefore, the obligations for documentation.

Any regular drug ordered on a medicine chart in a very nursing and residential facility needs a separate prescription to be written to facilitate provide and, if the drugs are listed on the Medication List, to alter compensation of the pill roller. There square measure risks related to the duplication of a written medication order. There also are further, 'clerical' obligations,



Figure 1. Medicine Card (Source: Photo M. Tóth, www.msdl-mojeličky.sk)

and a possibility for a delay in treatment. Any timing in writing a whole prescription could entail a delay in providing or payment and, if the prescription is rarely written, there'll be no compensation for the price.

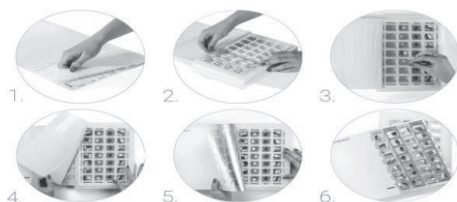


Figure 2. Procedure for packing drugs into a drug card (Source: Photo M. Tóth, www.msdl-mojeličky.sk)

THE RIGHTS OF THE PATIENTS/RESIDENTS

1. Right to applicable medical aid and Humane Treatment

Every person encompasses a right to health and medical aid admires his state of health, with none discrimination and inside the bounds of the resources, manpower, and ability on the market for health and medical aid at the relevant time. The patient has the correct to applicable health and medical aid of fine quality. Within the course of such, his human dignity, convictions, integrity, individual wants, and culture shall be revered. If somebody cannot instantly be a medically necessary treatment he shall, looking on his state of health, either be directed to attend for care or be referred or sent for treatment elsewhere, wherever the suitable care is often provided. If the patient should anticipate care, he shall be told of the rationale for the delay. Patients in an emergency shall be extended immediate medical aid and treatment with none deposit, pledge, mortgage, or any variety of advance payment for treatment.

2. Right to consent

The patient encompasses a right to a transparent, truthful, and substantial rationalization, in a manner and language apprehensible to the patient, of all planned procedures, whether or not diagnostic, preventive, curative, rehabilitative, or therapeutic, whereby the one that can perform the aforementioned procedure shall offer his name and credentials to the patient, prospects of any risk of mortality or serious aspect effects, issues associated with convalescence, and the chance of success and affordable risks. Informed the consent shall be obtained from a patient involved if he's of led and sound mind. Just in case the patient is incapable of giving consent and a 3rd party consent is needed.

The following persons, in the order of priority, declared hereinafter, could provide consent:

- i. Spouse;
- ii. Son or girl of legal age;
- iii. Either parent;
- iv. Brother or sister, or
- v. guardian

If a patient may be minor, consent shall be obtained from his folks or trustee. If next of kin, folks or legal guardians refuse to relinquish consent to a medical or surgical the procedure necessary to avoid wasting the life or limb of a minor or a patient incapable of giving consent, courts, upon the petition of the doctor or somebody fascinated by the welfare of the patient, in a

very outline continuing could issue associate degree order giving consent.

3. Right to Privacy and Confidentiality

The privacy of the patients should be assured in the least stages of his treatment. The patient has the proper to be free from unwarranted airing, except within for the hawing cases:

- a) once his mental or wholeness is in argument and therefore the applicable court, in its discretion, order him to pass through a physical or mental examination by a physician;
- b) once the general public health and safety, therefore, demand;
- c) once the patient waives this right in writing.

The patient has the proper to demand that every one info, communication, and records concerning his care be treated as confidential. Any health care supplier or professional concerned within the treatment of a patient and every one United Nations agency those that people who have legitimate access to the patient's record isn't approved to break any info to a 3rd party who has no concern with the care and welfare of the patient while not his consent, except

- a) once such speech act can profit public health and safety;
- b) once it's within the interest of justice and upon the order of a competent court;
- c) once the patients waive in writing the confidential nature of such information;
- d) once it's required for continuing medical treatment or advancement of medical science subject to de-identification of the patient and shared medical confidentiality for those that have access to the data.

Informing the significant other or the family to the primary degree of the patient's medical condition is also allowed; on condition that the tolerant majority shall have the proper to settle on whom to tell. Just in case the patient isn't of the majority or is mentally incapacitated, such info shall lean to the folks, trustee, or his next of kin.

4. Right to info

In the course of his/her treatment and hospitalization, the patient or his/her trustee features a right to be told of the results of the analysis of the character and extent of his/her malady, the other extra or any contemplated medical treatment on surgical treatment or procedures, as well as alternative the other extra medicines to be administered and their generic

counterpart as well as the potential complications and other pertinent facts, statistics or studies, relating to his/her ill health, any amendment within the arrange of care before the amendment is created, the person's participation within the arrange of care and necessary changes before its implementation, the extent to that payment perhaps expected from Phil health or any pay or and any charges that the patient was perhaps liable, the disciplines of health care practitioners WHO can finish the care and therefore the frequency of services that area unit projected to be supplied with.

The patient or his trustee has the right to look at associated lean an itemized bill of the hospital and medical services rendered within the facility or by his/her MD and alternative health care suppliers, regardless of the way and supply of payment. He is entitled to a radical rationalization of such a bill.

The patient or higher trustee has the right to be told by the doctor or his/her delegate of his/her continued health care needs following discharge, together with directions regarding home medications, diet, physical activity, and every one alternative pertinent info to market health and well-being.

At the finish of his/her confinement, the patient is entitled to a quick, written outline of the course of his/her ill health that shall embrace a minimum of the history, physical examination, diagnosis, medications, surgical operation, accessory, and laboratory procedures, and also the arrange of any treatment, and that shall be provided by the attending a doctor. He/she is likewise entitled to the reason of, and to look at, the contents of the case history of his/her confinement however with the presence of his/her attending doctor or in the absence of the attending doctor, the hospital's representative. nevertheless that he/she could not be ready to settle his accounts by reason of monetary incapacity, he/she is entitled to copy, at his/her expense, the pertinent half or components of the medical record the purpose or functions of that he shall indicate in his/her writing request for a copy. The patient shall likewise be entitled to the medical certificate, free of charge, with respect to his/her previous confinement.

5. The proper to settle on Health Care supplier and Facility

The patient is absolved to opt for the health care supplier to serve him still because of the facility except once he's below the care of a service facility or once public health and safety, therefore, demands or once the patient expressly waives this right in writing.

The patient has the proper to debate his condition with an adviser specialist, at the patient's request and expense. He additionally has the right to hunt for a second opinion and consequent opinions, if applicable, from another health care provider/practitioner.

6. Right to Self-Determination

The patient has the proper to avail himself/herself of any suggested diagnostic and treatment procedures. Any person of led Associate in Nursing of sound mind could build an advance written directive for physicians to administer terminal care once he/she suffers from the terminal section of a terminal illness: providing

- a) he's up to one of the medical consequences of his choice;
- b) he releases those concerned in his care from any obligation relative to the implications of his call;
- c) His decision won't prejudice public health and safety.

7. Right to spiritual Belief

The patient has the right to refuse medical treatment or procedures which can be contrary to his spiritual beliefs, subject to the restrictions represented within the preceding subsection: Provided, That such a right shall not be obligatory by folks upon their kids WHO haven't reached the legal status in an exceedingly the life-threatening scenario as determined by the attending Dr. or the medical director of ability. The need to saturate spiritual needs is as important as others, especially in terms of improving the quality of life (Cintulová Ludvigh *et al.* 2018a).

8. Right to Medical Records

The patient is entitled to an outline of his anamnesis and condition. He has the correct to look at the contents of his medical records, except medical specialty notes and alternative exculpatory info obtained concerning third parties, with the attending Dr. explaining contents therefrom. At his expense and upon discharge of the patient, he might get from the health care establishment a replica of a similar record whether or not or not he has absolutely settled his indebtedness with the Dr. or establishment involved.

The health care establishment shall safeguard the confidentiality of the medical records and to likewise make sure the integrity and credibility of the medical records and shall keep a similar inside a cheap time as is also determined by the Department of Health.

The health care establishment shall issue a medical certificate to the patient upon request. Any other document that the patient might need for insurance claims shall even be created out there to him inside forty-five (45) days from the request.

9. Right to depart

The patient has the correct to leave the hospital or the other health care establishment no matter his physical condition:

- a) he/she is conversant with the medical consequences of his/her call,
- b) he/ she releases those concerned in his/her care from any obligation relative to the implications of his decision,
- c) his/her decision won't prejudice public health and safety.

No patient shad is detained against his/her can in any health care establishment on the sole basis of his failure to absolutely settle his monetary obligations. However, he/she shall solely be allowed to depart the hospital provided acceptable arrangements are created to settle the unpaid bills: Provided. Further, that unpaid bills of patients shall be thought-about as a loss of financial gain by the hospital and health care provider/practitioner and shall be subtracted from the gross financial gain as financial gain loss solely thereon specific year.

10. Right to Refuse Participation in Medical analysis

The patient has the right to be suggested if the health care supplier plans to involve him in medical analysis, together with however not restricted to human experimentation which can be performed solely with the written consent of the patient: Provided, That, associate institutional review board or moral the review board in accordance with the rules set within the Declaration of the port be established for analysis involving human experimentation: Provided, further, That the Department of Health shall safeguard the continued coaching and education of future health care provider/practitioner to make sure the event of the health supply within the country: Provided, furthermore, That the patient concerned within the human experimentation shall be created tuned in to the provisions of the Declaration of the capital of Finland and its several tips.

11. Right to Correspondence and to Receive guests

The patient has the right to communicate with relatives and different persons and to receive guests subject to affordable limits prescribed by the principles and laws of the health care establishment.

12. Right to categorical Grievances

The patient has the right to categorical complaints and grievances regarding the care and services received

without worrying about discrimination or retaliation and to grasp regarding the disposition of such complaints. Such a system shall afford all parties involved with the chance to settle amicably all grievances.

13. Right to learn of His Rights and Obligations as a Patient

Every person has the correct to be hip two of his rights and obligations as a patient. The Department of Health, in coordination with health care suppliers, skilled and civic teams, the media, insurance firms, people's organizations, local government organization, shall launch and sustain a nationwide info and education campaign to build best-known to folks their rights as patients, as declared during this Act Such rights and obligations of patients shall be announced in an exceedingly bulletin board prominently placed in an exceeding health care establishment. It shall be the duty of health care establishments to tell of their rights in addition to the establishment's rules and laws that apply to the conduct of the patient whereas within the care of such an institution.

Dávidová, Hardy, Hamarová (2017) highlight a need to improve the professionalism and efficiency of the helping process to the vulnerable, especially those who are depended on the care of the others. It is worth to network stake holders, care suppliers and professionals to make this process addressed, effective and useful.

THE NATIONAL RESIDENTIAL MEDICATION CHART

This the initiative was meant to cut back the executive burden for prescribers, pharmacists, and nurse employees by up the timeliness of prescribing and dispensing and minimizing the duplication of effort for residents. The construct ought to enhance medication safety by reducing the chance of transcription errors that arise from the requirement to jot down drug orders double – once on the chart and once more on the prescription.

The development of the Medication Administration Chart (MAR chart), sections layout, practicality, and length of the chart for nursing and residential homes incontestable vital reductions in medication administration errors and fewer incorrect packaging of residents' medicines.

In addition, the Council for Nursing and Midwives within the UK has developed a group of tips referred to as 'Standards for the Management of healthful Products', that define the principles for safe and effective management and administration of medicines. The rule provides twenty-six standards to confirm that

each one drug-related activity follows best practices for safe and effective drug delivery (NMC).

FORMAT

The Nursing and Residential Medication Chart can be a 52-page landscape format book that has sections for patient identification, resident assessment, allergy, and weight and glucose documentation. It's meant to last for four months. House is provided for ordering and recording the administration of standard medicine, eight short medicine, six when-required medicine (PRN), and 3 nurse-initiated medicines. There may be 3 anticoagulant medication orders (or different variable dose drugs) with connected pathology directions and results, 3 regular hypoglycaemic agent orders, and 4 'when-required' hypoglycaemic agent orders (PRN).

The chart additionally includes house for recording biological process supplementation and provide to residents from dose administration aids. If medicines square measure administered to home, their delivery should be documented within the drug record tables (MARs). The MAR graphs represent the most documentary record of drug administration to purchasers. every shopper ought to have a separate MAR that has details regarding the resident, as well as his name, date of birth, and allergic reaction standing, listing all medicines to run to the shopper, with connected dosing directions, any special directions or precautions related to the medication. And provides a grid during which messages square measure recorded; if the message isn't given, the rationale for omission should run exploitation the outlined codes (NMC 2008).

There is no uniform outlined format for a MAR charts, however, the content is going to be roughly similar, letting economical shopper management and sequent recording of such a message. Most facilities ought to run a 28-day treatment cycle, thus MAR charts typically have a 28-day amount. MAR charts can be generated by a pharmacy that has medicines for social services facilities. MAR charts maybe are written or Medications will typically be modified throughout a monthly cycle, either by adding "temporary" medications, like in acute conditions, or the client's existing medications may be modified, for instance, thanks to dose changes. A separate MAR is offered for temporary medicines. With reference to changes to existing healthful merchandise, the accountable employee/qualified workers shall submit amendments to the prevailing MAR table (s) to replicate the changes in an exceedingly clear and fair manner; the doctor prescribing these changes ought to be documented and

everyone changes and additions ought to be signed and licensed.

The Act on the Registration of healthful merchandise is a vital restrictive demand. For instance, beneath the Children's Classification laws 2002, every facility should have a "registered person" WHO has overall responsibility for guaranteeing the effective recording, handling, safe storage, safe administration, and disposal of medicines. In England, the standard of Care Commission has issued quality and safety pointers accentuation the provider's responsibility for compliance with the provisions of the Health and Social Care Act of 2008. The rules emphasize the importance of creating effective procedures for the management of medicines and documentation of medicines.

IMPLEMENTATION

The Medication Administration Chart incorporates a number of the medication safety principles of the patient Medication Chart. However, the specified safety and potency outcomes can solely be achieved if nursing and residential facilities and health professionals notice the Chart straightforward to use. Doctor, and firms printing drug medical aid charts, report that there has been restricted implementation of the Medication Chart. This might ensue to factors known by nursing and residential workers, including:

- increased medication spherical times as a result of having to manoeuvre back and forward through the numerous pages and completely different sections of the chart
- increased potential to miss medication or modification of dose if they're written in numerous sections
- the value of printing a chart incorporating many colours
- the time to speak changes to the pharmacy as a result of eager to copy and fax a minimum of twelve pages
- the would like for doctors to hand-write all entries, as well as sections needed that may preferably be generated mechanically in their prescription software package E-Health
- the would like for doctors to rewrite the total chart each four months
- the would like for pharmacists to take care of a duplicate of a minimum of twenty-two pages of the chart, access the proper page so as to record in progress dispensing of AN item, annotate the copy with details of every item distributed, stop dispensing once the chart is four months previous, and still access hard-copy scripts for a specific medication.

Some of the known factors don't seem to be specific to the Medication Chart and relate to changes in applications related to the new format and processes. Thanks to varying health professionals and also the important changes concerned, implementation of the Medication Chart needs an in-depth modification management method.

Recommendation for practice is that at all times, organisations should use their professional judgement and balance risk and benefit to the individual person they are providing the MAR chart for. Organisations should always act in the best interests of patient safety in accordance with their Code of Ethics. They should be prepared to support and justify (on the basis of patient safety) any decision they make which fall within the scope of best practice guidance.

Also most MAR charts include the name and address of the supplying pharmacy. When a pharmacy offers provision of MAR charts to care services they should ensure that the care service is supplied with clear instructions as to the way these documents are designed to be used to record medication. This is of particular relevance when a organisation changes the design of the MAR chart or when a care service moves to a new pharmacy supplier.

The MAR chart should include all prescribed externally applied medicines important details are how much to apply and when to apply. The MAR chart should include all external medicines that are still being applied by a nurse, whether prescribed that month or not.

CONCLUSION

The key tool to prevent deterioration of health and the provision of health and social assistance are social services that should be connected with medicine in nursing and institutional care. (Cintulová Ludvigh *et al.* 2018b). Some of the inefficiencies and risks related to the ordering and provide medicine in nursing and residential care facilities, arising from the external location of doctors and pharmacists are resolved by the capability to figure from one information supply within the type of the Medication Chart. Issues related to the implementation of the chart could also be thanks to each of the format of the chart and also the modification in practices related to its use. An electronic version of the Medication Chart might address the operational issues that are noted with the introduction of the paper version.

The care home resident ought to be seen as at the guts of the medication administration the method, maybe as a client for whom a service is being provided however definitely, as somebody's being whose dignity, rights, and preferences area unit of dominant importance. Like several alternative aspects of care

home care, the administering of medication ought to adopt a resident - centred approach. It is the responsibility of the care home to make sure that adequate systems for managing, administering, and observation medication area unit in situ and a review of medication systems by an outdoor skilled, as an example a health care provider might facilitate to spot any deficiencies.

The issues raised during this report facilitate to spotlight ways that within which systems may be strong to assist employees to avoid medication administration errors. Some concepts like ensuring all residents have water before the medication spherical, avoiding interruptions, and requesting copies of original medication data leaflets area unit comparatively straightforward to attain. Others, like guaranteeing MAR charts area unit written and have images of the resident, or asking that medication that doesn't get to be taken within the morning be prescribed for later within the day, might take a touch additional the effort to line up.

In view of the higher than, it follows that a given drug record chart is required in each caregiver's house. Abroad, there's usually spoken drug management and it should be applied in our country additionally. The medication associate decreed route of administration should be recorded to see whether or not there has been a dose, underneath the dosing of the patient, or solely miscalculation in administration. This may conjointly save cash that's spent on medicines for the old. Drug records ought to be the most and necessary customary for all nursing homes in European countries.

Declaration: No Conflict of Interest.

REFERENCES

- Allred DP (2009). Medication errors in Nursing & Residential care homes prevalence, consequences, causes, and solutions. Care home use of medicines study (CHUMS) 2009; London: report back to the Patient Safety analysis Portfolio, Department of Health.
- Allred DP (2011). The influence of formulation and drug delivery system on medication administration errors in care homes for older folks, *BMJ Quality and Safety* twenty 2011; (5): 397-401.
- Allred DP (2010). The recording of drug sensitivities for older folks living in care homes, *British Journal of Clinical medical specialty* sixty-nine (5): sixty-nine. Australian Department of Health. Guiding principles for medication management in residential aged care facilities; 2010. [online] [cit.2017-03-09]. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/content/nmp-pdf-re>.
- Burns P (2007). The introduction of electronic medication charts Associate in Nursing prescribing in aged care facilities: An analysis *Ageing* 2007; 26.
- Bollen C, Warren J, Whenan G (2005). Introduction of electronic prescribing in an Associate in a Nursing aged care facility. *Aust Fam doc* 2005; 34:283-7.
- Coombes ID, Reid C, McDougall D, Stowasser D, Duiguid M, Mitchell C. Pilot (2011). National inmate Medication Chart in Australia: up prescribing a safety and sanctionative prescribing coaching. *Br J Clin Pharmacol* 2011; 72:338-49.
- Dávidová M, Hardy M, Hamarová M (2017). Prežívanie zmysluplnosti a bezpečný typ vzťahovej väzby ako významný spôsob pomoci pre prácu v oblasti pomáhajúcich profesií. *Acta Missiologica* 2017; 11:2:2.
- Edwards PJ, Roberts I, Clarke MJ, DiGuseppi C, Wentz R, Kwan I, Cooper R, Felix LM & Pratap S (2009). Ways to extend response to communicating and electronic questionnaires (Review) 2009; *Cochrane information on Systematic Reviews*.
- Flynn E., Barker KN, Pepper GA, Bates DW & Mikeal RL (2002). Comparison of ways for a detective work medication errors in thirty-six hospitals and skilled-nursing facilities.
- Lewis PJ, Dornan T, Taylor D, Tully MP, Wass V & Ashcroft D (2009). Prevalence, incidence, and nature of prescribing errors in hospital inpatients: a scientific review. *Drug Safety* 2009; 32(5): pp.379-89.
- Lilford R (2009). Evaluating complicated (patient safety) interventions. In: King's Patient Safety and Service Quality analysis Centre seminar 2009; London.
- Lofland J & Lofland LH (1995). Analyzing social settings: a guide to qualitative observation and analysis 1995; 3rd ed. London, Wadsworth.
- Cintulová Ludwig L, Tománek P, Parák L. (2018a). Fullfilment of needs of people with disabilities in the context of the quality of life. In *Przegląd Nauk Stosowanych, Relacje w przestrzeni społeczno-ekonomiczne*. 2018; Nr 20, p. 32-42. ISSN 2353-8899.
- Cintulová Ludwig L, Tománek P, Parák L (2018b). The Key Tools In Social Work With People With Disabilities. In *Przegląd Nauk Stosowanych, Relacje w przestrzeni społeczno-ekonomiczne*, 2018, Nr 20 p. 43-54. ISSN 2353-8899.
- Lummis H, Skerries I & Veldhuyzen van Zanten S (2006). A systematic review of the utilization of patients' own medications in acute care establishments. *J Clin Pharm Ther* 2006; 31: 541-63.

16. Norman DA (1981). Categorization of action slips. Psychological Review 1981; **88**(1): pp.1–15.
17. NPSA (2010). Fast Response Report NPSA/2010/RRR009: Reducing hurt from omitted and delayed medicines in the hospital. Supporting data. London, National Patient Safety Agency 2010.
18. NPSA (2010). Fast Response Report. Reducing hurt from omitted and delayed medicines in the hospital. NPSA/2010/RRR009. London, National Patient Safety Agency 2010.
19. Nursing & Midwifery Council (2008) Standards for medicines management 2008 London: NMC
20. Poon EG, Keohane CA, Yoon CS, Ditmore M, Bane A, Levtzion-Korach O, Moniz T, Rothschild JM, Kachalia AB, Hayes J, Churchill WW, Lipsitz S, Whittemore AD, Bates DW & Gandhi TK (2010). Impact of bar - code technology on the protection of medication administration. N Engl J master's degree 2010; **362**(18): pp.1698–707.
21. Savage J (2000). Descriptive anthropology and health care. BMJ (Clinical analysis impotence.) 2000; **321**(7273).
22. Somers M, Rose E, Simmonds D, Whitelaw C, Calver J, Beer C (2010). Quality use of medicines in residential aged care. Aust Fam doc 2010; **39**:413-6.

* * * * *

Information about International Conference

Informácia o medzinárodnej konferencii

Vysoká škola zdravotníctva a sociálnej práce sv. Alžbety, n.o., v Bratislave,
v spolupráci so Slovenskou Komorou sestier a pôrodných asistentiek
a Slovenskou Komorou sociálnych pracovníkov a asistentov sociálnej práce
a v spolupráci s Sliezskou lekárskou univerzitou,
Fakultou zdravotníckych vied v Katowiciach, Fakultou fyzioterapie
pripravujú usporiadanie 16. medzinárodnej vedecko-odbornej konferencie

SPOLUPRÁCA POMÁHAJÚCICH PROFESIÍ POLSKO – ČESKO – SLOVENSKÉ ŠTÚDIE COOPERATION OF HELPING PROFESSIONS POLISH-CZECH-SLOVAK STUDIES

Miesto konania konferencie: Ustroń, 26. – 27. marec 2021
Ośrodek Rehabilitacyjno-Wypoczynkowy „Muflon” 43-450 Ustroń – Zawodzie ul. Sanatoryjna 32, Polska

**Plánovaný termín konferencie v roku 2020 v dňoch 23.-24. október 2020 bol organizátormi
preložený z dôvodu nepriaznivej epidemiologickej situácie**

Cieľom konferencie je prehĺbiť spoluprácu v oblasti zdravotníctva, ošetrovateľstva,
sociálnej práce a v pomáhajúcich profesiách v 21. storočí.

Tematické zameranie konferencie zahŕňa:

Zdravotníctvo, Ošetrovateľstvo, Rehabilitácia, Fyzioterapia, Laboratórne vyšetrovacie metódy,
Sociálna práca, Sociálne služby, Dobrovoľníctvo, Etika, Náboženstvo, Pedagogika, Varia.
Aktívna účasť je možná formou plenárnej prednášky, prednášky v jednotlivých sekciách a v sekcii posterov.
Dĺžka trvania prednášky: 10 minút. Diskusia po skončení prednášky: 5 minút
Predpísané rozmery posterov: 120 cm (výška) x 90 cm (šírka); Postery budú vystavené na paneloch
v miestnosti určenej na tento účel. Diskusiu v sekcii postery bude moderovať moderátor.
Abstrakty príspevkov a posterov odprezentovaných na konferencii vyjdú na CD nosiči
ako Supplementum časopisu Zdravotníctvo a sociálna práca číslo 3 / 2020.
Plnotextové práce dodané autormi budú publikované v zahraničnom recenzovanom zborníku vedeckých prác
Každý aktívny účastník zasiela prihlášku samostatne.
Prihlásiť sa na konferenciu a uhradiť konferenčný poplatok musí nielen prvý autor príspevku alebo posteru
ale aj všetci ostatní uvedení spoluautori v prihlásenom príspevku alebo posteru.

**Fultexty dodané prihlásenými účastníkmi budú vydané
formou knižnej publikácie prostredníctvom Sliezskej lekárskej univerzity s poľským ISBN.**

Návrh programu konferencie:

26.03.2021 (piatok):

Registrácia účastníkov do 13:00 hod.; Obed (s obsluhou); 13:00 - 14:00 hod.; Otvárací ceremoniál; 14:00 -
14:20 hod. ; Plenárne prednášky: 4 – 5 prednášky (čas 15 min.); 14:20 - 16:00 hod.
Prestávka na kávu. 16:00 - 16:30 hod. ; Štyri sekcie po 6 prednášok (prezentácií) podľa počtu prihlásených
účastníkov (v dĺžke trvania 10 min. a diskusiou). 16:30 - 18:00 hod.
Postery: 18:00 – 18:30 hod. ; Spoločenské posedenie 19:00 hod

27.03.2021 (sobota):

8:00 – 8:30 raňajky; 8:45 - 10:30 hod. 4 sekcie po 6 prezentácií podľa počtu prihlásených účastníkov
10:30 prestávka na kávu a záver konferencie; 11:00 Odchod z hotela.

Doprava zo Slovenska: Bratislava – Žilina – Čadca (SR) – Třinec (ČR) – Leszna Górna – Ustroń (PL)

Kontaktná adresa (prihlášky a informácie): konferencia.ustron2020@gmail.com

MICRODACYN 60® HYDROGÉL SPRÁVNÁ VOEBA PRI OŠETROVANÍ ULCUSU CRURIS. KAZUISTIKA

Jaroslava HUDÁČKOVÁ

Oddelenie dlhodobých chorých, Fakultná nemocnica s poliklinikou J. A. Reimana v Prešove

Kontaktná adresa: A care, Sládkovičova 10, 921 01 Piešťany; e-mail: acare@acare.sk

SÚHRN INFORMÁCIÍ O OCHORENÍ

Ulcus cruris je strata kožnej substancie zasahujúcej rôzne hlboko do podkožných tkanív. Ide o chronickú ranu s dobou hojenia niekoľko týždňov, mesiacov aj rokov. Vzniká následkom závažných trofických zmien tkaniva poškodených predchádzajúcim ochorením, najčastejšie vaskulárnym. Vyskytuje sa predovšetkým vo vyššom veku. Ide o polyetiologické ochorenie.

Vo väčšine prípadov vzniká následkom vážnych trofických zmien - až v 85 % žilového pôvodu (tzv. venózne vredy), v 10 % tepnového pôvodu, zvyšných 5 % má inú príčinu.

Vonkajšie príčiny: fyzikálne, chemické, infekčné, artefakty.

Vnútoré príčiny: poruchy venózne, arteriálne, lymfatické, hematogénne, koagulačné, metabolické, neuropatické ochorenia, vaskulitidy, tumory, zmiešané poruchy.

SÚHRN INFORMÁCIÍ O PRÍPRAVKU

Microdacyn 60® hydrogél je vysoko efektívny hydrogél na ošetrovanie popálenín, chronických, akútnych a infikovaných rán. **Microdacyn 60®** zaujíma v kategórii prípravkov zameraných na ošetrovanie rán zvláštnu pozíciu, pretože princíp, na základe ktorého pracuje, nie je založený na špecifických chemicko-syntetických zložkách. **Microdacyn 60®** je biologicky aktívna liečba na debridement, zvlhčenie a zníženie mikrobiálnej záťaže akútnych a chronických rán, ktoré sa ťažko hoja, sú infikované a pod. Je absolútne bezpečný, ako pre pacienta, tak pre poskytovateľov starostlivosti. **Microdacyn 60®** znižuje mikrobiálnu záťaž elimináciou patogénnych jednobunkových mikroorganizmov, bez toxických alebo iných škodlivých účinkov na ľudské tkanivo. Navyše **Microdacyn 60®** prispieva k vlhkému prostrediu v rane a z toho plynúce rýchlejšie hojenie rany. Produkt je nielenže vysoko účinný, ale je tiež veľmi užívateľsky príjemný. Je neдрáždívý pre kožu, oči alebo hrdlo a odstraňuje zápach. **Microdacyn 60®** sa neriedí a je nachystaný na priame použitie. Je ekologický. Po použití sú aktívne zložky znížené na 0, čo znamená, že výrobok nemusí byť likvidovaný v nemocničnom

odpade. **Microdacyn 60®** sa môže kombinovať s inými formami ošetrovania rán.

Microdacyn 60® vyrobený elektrolýzou ultra - čistej vody a NaCl. **Microdacyn 60®** denaturuje bunkovú stenu jednobunkových organizmov, čím spôsobuje jej prasknutie a rozloženie. Štúdie tiež preukazujú, že **Microdacyn 60®** má protizápalové a antialergické účinky, ktoré prispievajú k rýchlejšiemu hojeniu rany.

KAZUISTIKA

Vred predkolenia ulcus cruris 1. sin. chronica perimaleolaris varicosum.

Pacient: Vek 74 rokov. Pohlavie: muž. Iniciály: G.J.

Pacient odoslaný na hospitalizáciu dermatovenerológom za účelom liečby dlhodobého (30 rokov) sa nehojajúcich ulcusov cruris na ľavej dolnej končatine na vonkajšej aj vnútornej strane členka, pacient polymorbidný, warfarinizovaný, diabetik; udáva výrazné dolešti LDK. Hospitalizácia na oddelení od 11.5. do 5.6. 2015.

Popis ulcusov pri prijatí: spodiny ulcusov na ľavej dolnej končatine povlečené, secernujúce, zapáchajúce. Vnútorá oblasť členka veľkosť 7 x 9cm; vonkajšia oblasť členka 2 x defekt o priemere 2cm.

Ošetrovanie

Počas celej hospitalizácie boli defekty ošetrované podľa ordinácie lekára **Microdacyn** roztokom, **Microdacyn 60®** hydrogélom a následne bolo nasadené sterilné krytie. Preväzy boli vykonávané denne, počas celej hospitalizácie. Ako vidno v obrazovej prílohe, pri prijatí boli defekty povlečené, secernovali, pri prepustení už vidno čistú spodinu defektov, neseccerujú, nezapáchajú, aj veľkosť rany bola menšia.

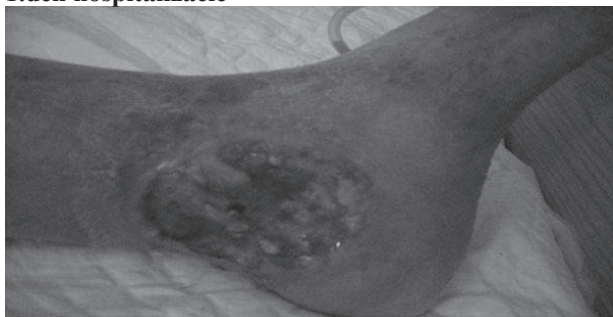
ZÁVER

Pacientovi je odporúčané pokračovať v liečbe prípravkom **Microdacyn 60®** hydrogél aj v domácom prostredí, cestou rajónného dermatovenerológa, kde je pacient dlhodobý dispenzarizovaný a po 10 mesiacoch od prepustenia sú viditeľné výsledky (viď pripojená fotografická príloha).

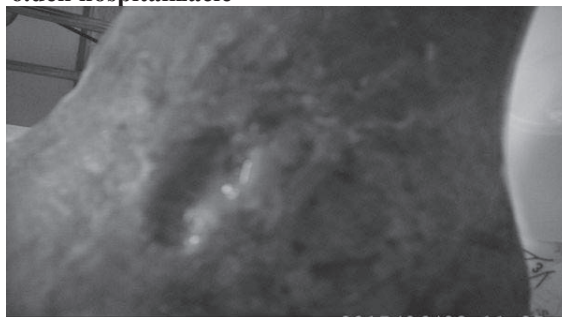
Konflikt záujmov: Bez konfliktu záujmov.

Fotografická príloha

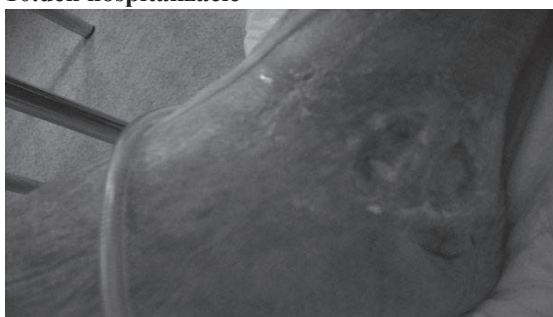
1.deň hospitalizácie



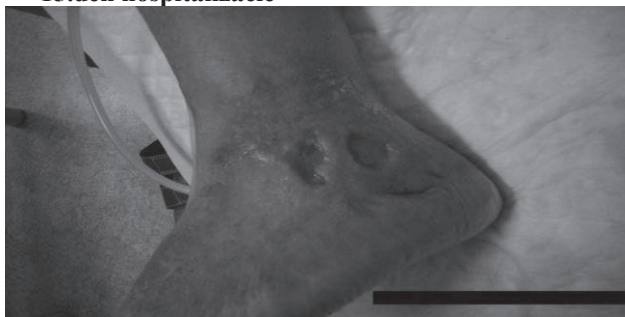
6.deň hospitalizácie



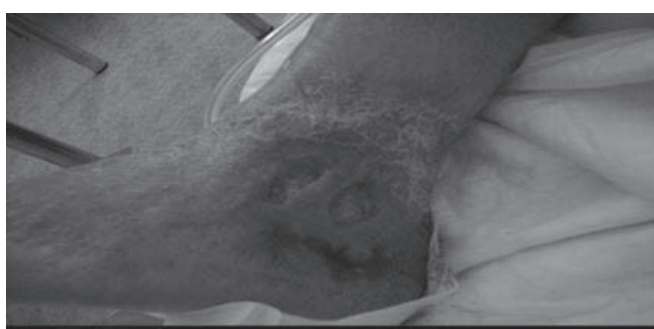
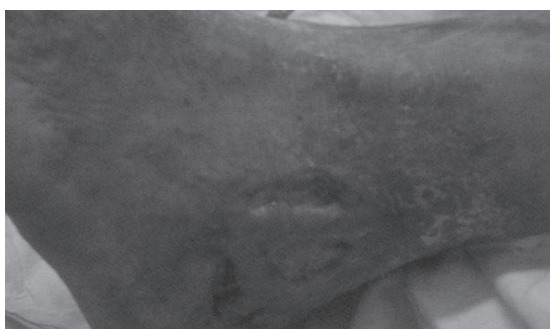
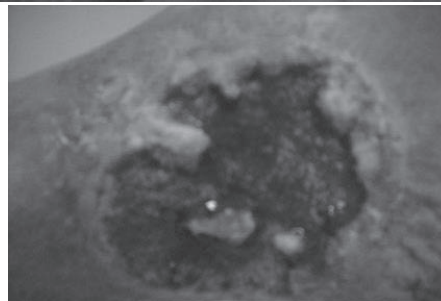
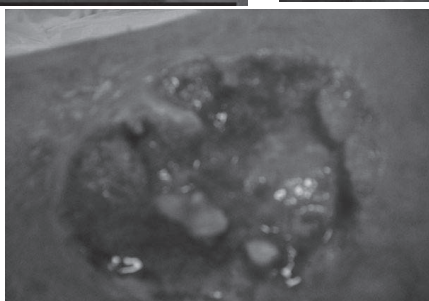
10.deň hospitalizácie



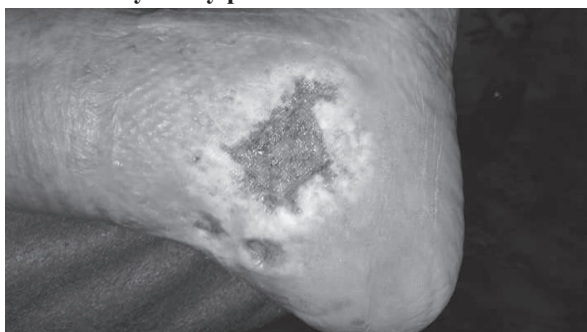
15.deň hospitalizácie



21.deň, prepustenie



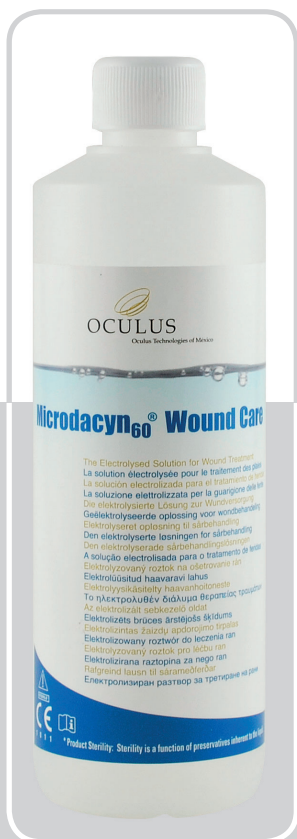
Viditeľné výsledky po 10 mesiacoch liečenia s Microdacyn 60®



Microdacyn₆₀[®] Wound Care

Microdacyn[®] hydrogel

A care



Vysoko účinná liečba na čistenie, zvlhčenie a zníženie mikrobiálnej záťaže akútnych a chronických rán, infikovaných rán, dekubitov, odrenín, popálenín a ulcerácií inej etiológie. Jediný produkt so stabilným pH od otvorenia balenia až po jeho spotrebovanie.

Indikácie

- ošetrovanie akútnych a chronických rán – dekubity, chronické vrede, vrede diabetickej nohy, vrede predkolenia, onkologické rany, chirurgické rany, infikované a nekrotické rany, ošetrovanie popálenín (aj po opaľovaní)
- ošetrovanie odrenín, škrabančov a menších poranení
- ošetrovanie okolia stomií
- výplach slizníc, ústnej dutiny a hrdla
- MRSA – dekontaminácia celého tela
- Dekontaminácia pred cievkovaním

Fakty a výhody

- antimikrobiálny, protizápalový a regeneračný účinok
- likviduje baktérie, vrátane MRSA a VRE, vírusy, kvasinky, spóry
- nepoškodzuje zdravé tkanivo
- pH neutrálny
- eliminuje zápach
- kompatibilný so všetkými formami liečby rán
- nákladovo efektívny – znižuje celkovú dobu liečby a hospitalizácie
- vysoká stabilita – až 24 mesiacov
- nevedie k rezistentným reakciám
- účinne hydratuje ranu a jej okolie
- neštípe, nedráždi pokožku, oči ani sliznice

A care, s.r.o.

Hraničná 5, 922 10 Trebatice
acare@acare.sk, www.acare.sk

Bezplatná infolinka: 0800 183 801



NAŠE PRIORITY:

- » PACIENT na prvom mieste
- » BEZPEČNÁ a KVALITNÁ starostlivosť
- » ZAMESTNANCI sú potenciálom spoločnosti
- » Podpora VEDY, VÝSKUMU a VZDELÁVANIA
- » SPOLUPRÁCA so školami a univerzitami

PONUKA PRE ŠTUDENTOV

ŠTIPENDIJNÝ PROGRAM PRE ŠTUDENTOV V ODBORE - VŠEOBECNÉ LEKÁRSTVO - OŠETROVATEĽSTVO - DIPLOMOVANÁ VŠEOBECNÁ SESTRA

Viac na
www.agelsk.sk/kariera



Inovatívne riešenia pre Váš biznis



Vývoj softvéru na mieru

Dodávky hardvéru

Dodávky dátových sietí

Realizácia bezpečnostných
projektov

Vývoj a úprava IS

Analytické práce

Vzdelávanie a školenia

Konzultácie pre zákazníkov

SÍDLO SPOLOČNOSTI

Kupecká 9, 949 01 Nitra

Pobočka Bratislava

Budova Pressburg Tower

Plynárenská 6/a, 821 09 Bratislava

Pobočka Banská Bystrica

Námestie Slobody 2, 974 01, Banská Bystrica

Sme spoľahlivý partner

www.microcomp.sk