European journal of volunteering and community-based projects

Vol.1, No 2; 2022 **ISSN: 2724-0592**

E-ISSN: 2724-1947

sponsored by

Organizzazione Italiana
Sviluppo Innovativo

Journal of
Odv Casa Arcobaleno
Iscritta Registro Terzo Settore della Regione Piemonte
C.F. 94570230014

Publication: 30th June 2022

Data di pubblicazione: 30 Giugno 2022

Place of publication: Torino (Italy)

About the journal

The journal aims to address issues related to the third sector and community-based activities. The magazine therefore has the aim of spreading the culture of the third sector (voluntary organizations, social promotion associations, philanthropic bodies, social enterprises, mute aid companies, recognized and non-recognized associations, ecclesiastical bodies), the topics of interest are:

Social services

Health interventions and services

Education, health education and training

Safeguarding and improving environmental conditions

Protection and enhancement of cultural and landscape heritage

University and post-university education

Organization and management of cultural, artistic or recreational activities of social interest

Community sound broadcasting

Tourist activities of social, cultural or religious interest

Extra-curricular training, aimed at preventing early school leaving and at school and training success, at preventing bullying and combating educational poverty

Development cooperation

commercial, production, education and information, promotion, representation, licensing of certification marks, carried out within or in favour of fair-trade chains

Services aimed at introducing or reintegrating workers and disadvantaged people into the labour market

Social housing

Humanitarian Reception

Social agriculture

Organization and management of amateur sports activities

Charity, distance support, free food supply

Promotion of the culture of legality, peace between peoples, nonviolence and unarmed defence

Promotion and protection of human, civil, social and political rights, as well as the rights of consumers and users of activities of general interest

Civil protection

International adoption procedures

Redevelopment of unused public goods or assets confiscated from organized crime.

The journal also welcomes contributions on medical activities or groups of citizens that have an impact on general well-being.

Editor in Chief: Valerio Brescia

Editorial Board:

Name	Position	Institution	Affiliation third sector
Albertini Emidio	Associate Professor	University of Perugia - Department of Agricultural, Food and Environmental Sciences	Omphalos Perugia
Amelio Stefano	Researcher	University of Milano Bicocca - Department of Management	Società Italiana di Storia della Ragioneria
Barbareschi Giorgio	Programme Manager / PhD In medical Science, MSc in Community and Clinical Psychology	European AIDS Treatment Group	Lila Piemonte
Bazzano Alberto	Lawyer, cultore della materia	Law firm Papotti, Cultore di Criminal law, Comparative criminal law and Criminology in the Department of Law - University of Turin.	
Bert Fabrizio	Researcher, Dr. Specialized in Public health Corporate Health Department	University of Turin - Department of Health, Public and Pediatric Sciences City of Health and Science of Turin Hospital "Città della Salute e della Scienza" of Turin	EUPHA
Biancone Paolo	Full Professor	Department of Management, University of Turin	
Biancuzzi Helena	Research fellow in business economics	Department of Economics and statistics, University of Udine (Italy)	Ipazia, Observatory on Gender Research
Bosa Marco	Dr. specialization in internal medicine	Rivoli Hospital (Italy)	Odv Casa Arcobaleno

Brescia Valerio	Researcher	University of Turin - Department of Management, University of Piemonte Orientale - DiSEI SAA	Sidrea Odv Casa Arcobaleno
Breveglieri Michele	Phd, specialized in sociology	Job Promotion - Internship Office of the City of Verona	Arcigay Nazionale
Burlina Chiara	PhD in Economics and Management	Gran Sasso Science Institute - GSSI	AISRe SIE RSA
Caratù Myriam	Phd, Lecturer and research fellow	University for Foreigners of Perugia, PG (Italy) Teacher at IIS Caterina da Siena, Communication Design and Fashion Technology, Milan (Italy)	
Campra Maura	Full Professor	Department of Economics and Business Studies, University of Piemonte Orientale “Amedeo Avogadro”	AIDEA
Cataldo Alessandro	Phd, nurse and Sociologist public manager	Local Health Authority 3 Liguria	Associazione Culturale Gaia
Cocco Gabriele	Researcher	University of Bergamo - Department of Languages, Letters and Foreign Culture	
Creta Fabio	Phd and lecturer	School of Management of Turin (SAA)	Blockchain education Network
Costa Stefano	Dr. specialized in general medicine	Local Health Authority TO4	Odv Casa Arcobaleno
Dal Mas Francesca	lecture	Department of Management Lincoln International Business School University of Lincoln, UK	Ipazia, Observatory on Gender Research Sidrea IAKM ICAA

De-Coll' Letizia	Psychologist, Health and Community Intervention	Centro Milanese di Terapia della Famiglia	Ordinary member ONIG (Osservatorio Nazionale Identità di Genere) Member of the Executive Board Il Grande Colibrì Odv
Esposito Paolo	Associate Professor	Department of Law, Economics, Management and Quantitative Methods (DEMM), University of Sannio (Italy)	Sidrea
Fijalkowska Justyna	Assistant Professor	University of Lodz, School of Social Science	
Foglietta Chiara	Phd, Biomedical engineer Councillor for Innovation, City of Turin	City of Turin	
Giusta Marco Alessandro	criminal psychology	City of Turin	Associazione Commetorino Arcigay Nazionale CGIL
Gualano Maria Rosaria	Associate Professor	University of Turin - Department of Public and Pediatric Health Sciences	SITI
Iorio Michele	Lecturer, Dr. specialized in forensic medicine	University of Turin - Department of Public and Pediatric Health Sciences	AMAC
Irato Elisa	Veterinary and temporary research fellow	Faculty of Veterinary Medicine, University of Turin	
Landi Stefano	Research Fellow and lecturer	Ca 'Foscari University of Venice - Department of Management	
Libertino Andrea	Phd, Environmental Engineering	CIMA Research Foundation	AGESCI
Gottero Mauro	Doctor specialization in geriatrics and palliative care	Luce per la vita Onlus	Ottavio Mai di Torino

Jafari-Sadeghi Vahid	Lecturer (Assistant Professor) in Business Strategy	Aston Business School, UK	Academy of Management (AOM)- Divisions: Strategic Management, Entrepreneurship, and International Management Academy of International Business (AIB) International Academy of Business and Economics (IABE) Centre for Business in Society (CBiS), Coventry University International Centre for Transformational Entrepreneurship (ICTE), Coventry University
Leonilo Capulso	Phd, Educational Management	Department of Education, Schools Division Office of Pampanga, Philippines	International Literacy Association Australia Teaching & Education Research Association Asian Qualitative Research Association
Moretti Laura	Master's degree in Environmental Biology, Hygiene and Occupational Safety Temporary research fellow	Hospitale “Città della Salute e della Scienza” of Turin and University of Turin	
Namrata Hange	Doctor Specialization in Public and Occupational health	MOH Holdings (MOHH), Singapore	
Nuzzo Anna Maria	Phd, Postdoctoral fellowship in Biomedical-Translational Research & Academia	Department of Surgical Sciences, Univesity of Turin	
Orofino Giancarlo	Professor, Dr. specialization in infectious disease	University of Turin - Department of Clinical and Biological Sciences, Local health company City of Turin	Arcobaleno AIDS

Pisano Roberto	Phd, Full Professor	Politecnico di Torino - Department of Applied Science and Technology	
Pistoni Carlo	Psychology, Phd Student of Psycology	Università Cattolica di Milano	Society for Personality and Social Psychology (SPSP); Associazione Italiana di Psicologia (AIP - sezione Psicologia Sociale); Società Italiana di Psicologia di Comunità (SIPCO); European Association of Social Psychology (EASP); Institute of Family and Social Mediation of Brescia (IMB).
Presti Pietro	Phd, Master's degree in law	Fondazione Edo ed Elvo Tempia	European Cancer Patient Coalition
Quaglia Valeria	Research fellow in methodology of Social Research	University of Milano Bicocca, Department of sociology and social research	
Renzi Marco	structural engineer	Republic of San Marino - Design and engineering Office	
Sadraei Razieh	Research fellow, PhD in Chemical and Materials Sciences	University of Wolverhampton, UK	Murphy Group Research Chemical Institute of Canada Canadian Society of Chemistry
Santosh Kumar Behera	Associate professor	Associate Professor, Department of Education, Kazi Nazrul University, Asansol, Paschim Bardhaman, West Bengal, India	
Secinaro Silvana	Associate professor	Department of Management, University of Turin	EURAM
Sorrentino Annarita	Phd, Researcher	Department of Business and Quantitative Studies (DISAQ)	

		University of Naples Parthenope	
Villamaina Floriana	Nurse and trainer	Mauriziano Hospital of Turin - Training Office	IRC Croce Verde di Condove Associazione O.I.S.I.

Reviewers:

- Calandra Davide, Researcher in Business and Management, University of Turin, Italy

- Chmet Federico, Phd, lecture in Business and Management, University of Turin, Italy

- Gideon Mekonnen Gideon, Phd student in Computer and Systems Sciences (DSV) Stockholm University (Sweden)

- Iannaci Daniel, Phd in Business and Management, University of Turin and Cooperativa socialeArcobaleno

- Lanzalonga Federico, Phd student in Business and Management, University of Turin, Italy

- Margherita Emanuele Gabriel, Phd, Reseacher in Management Information Systems, University of Tuscia, Italy

- Megha Chotaliya, Assistant Professor and Head of Department of Accountancy and Research Guide, R.D. National College, University of Mumbai, Mumbai, India

- Sac. Tatulli Nicola Gioachino, Phd Student, Arcidiocesi di Bari Bitonto, Italy

Table of Content

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

The effects of COVID-19 on the priorities of the topic associated with community-based activities and citizen participation

Valerio Brescia

Presidente Odv Casa Arcobaleno, Ricercatore Dipartimento di Management - Università degli Studi di Torino, Visiting Professor Wroklaw University

Keywords: community-based; citizen participation

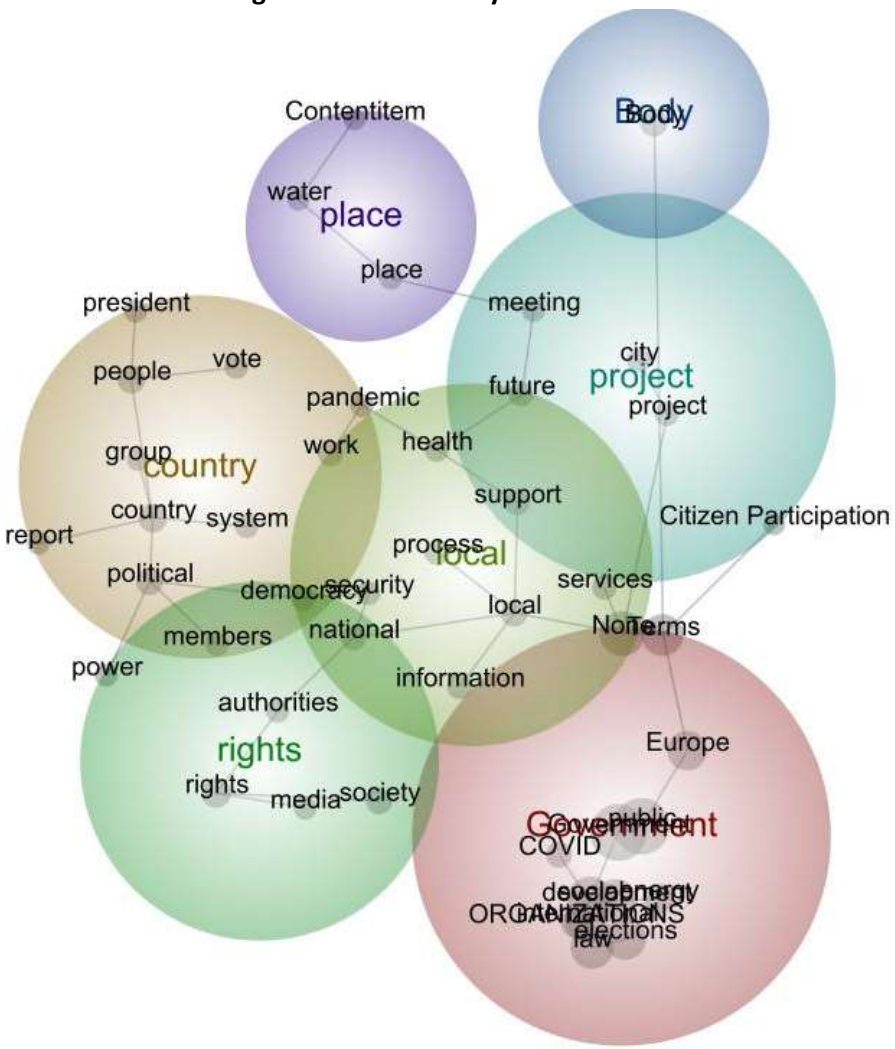
Doi: 10.5281/zenodo.6849627

Editorial

Citizen participation is one of the approaches on which New Public Management and New Public Governance are based and can be qualified as a community-based tool in the management of public administration or common goods (Strokosch & Osborne, 2020; Brescia, 2020; Secinaro et al., 2022). As a result of COVID-19, Europe may have changed and has identified new strands, approaches, and concepts that require the attention of scholars. Therefore, the analysis of reality can provide a greater vision in a stormy period than the analysis of academic literature alone could give. If in the business, management, and economics sector, we have a restructuring of approaches, systems, and contexts (Campra, Esposito & Brescia, 2020). The expectation is that there will be changes and priorities also in public participation that are different from those identified in the literature (Massaro et al., 2021). Therefore, from the results of NEXIS UNI, news, law, and business database (Knap, 2018), all the results have been identified in the magazines from 2021 to 2022 in which we talk about citizen participation, public participation, and citizen involvement. The identification of the times focused on the context of European sources and news only. The analysis identified and eliminated the duplicates, with 2529 results in English and Italian.
The content analysis conducted allows, with an objective method, to identify the primary key concepts (Secinaro et al., 2021). The software adopted for the analysis of the results is LEXIMANCER, which allowed the grouping based on the frequency with which the concepts appear in the text and the significance of the relationship of the elements expressed. Significance in the relationship between concepts also defines relationships and representation (Smith & Humphreys, 2006; Dal Mas, 2019; Secinaro et al., 2021a). By analyzing the texts extracted from the research on NEXIS UNI and the software, it was possible to define figure 1.

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

Figure 1 content analysis on NEXIS UNI extract.



The main topics dealt with by grouping associated with citizen participation, public participation and citizen involvement are government, country, local, place, rights, body and project.

Government

Government activities identify common strategies between distant states to identify the best policies, for example, the relationship between Sweden and Tanzania. In the process of change and revolution that the various governments are undergoing, various issues have been identified, including the number of inhabitants with attention to reproductive systems and family protection, the search for resolutive identification of conflicts associated with accessibility to essential services such as education and health and the search for suitable financial instruments.
In the debate, there is a search for digital platforms capable of providing transparency and fighting corruption not only at the national level but between the national and local levels. This approach is not oriented today only towards open government but also towards an approach that intends to identify the level and degree of representation and autonomy of the elected subjects at different levels, involving citizens not only in the initial voting project. Therefore, the division between responsibility and financial resources continues to play a critical role in reading and guiding the community's attention.
In some cases, entropy is identified in the relationship between politicians and citizens, where citizens elect someone they do not believe, and at the same time, the decreasing growth process has seen a distrust of those who govern towards their constituents. This system reduces rather than increases social growth.

The government cluster is associated with several micro-themes, including social networks associated with the government and outline specific attention that must be given to the needs expressed on social networks, needs that must be mediated and managed by society, and by politics that must be able to rework them. Many states and local authorities use digital platforms to provide information on significant events creating the basis for having a community app used later to receive flows from the citizen and give feedback. At the same time, the relationship between government and younger citizens remains, representing 65% of those who use social media and need appropriate dialogue and comparison approaches. Among other micro terms, the international report in which post covid the European Forum is the first forum for discussion to define the new guidelines at the national level. New attention has been paid to the population's health by focusing on certain issues such as air quality and continuous surveillance by the World Health Organization at the request of citizens and citizens' organizations. In international relations, the return of the attention given to the budget and the spending authorization process involves the issue of the budget for war refugees. Among the other macro-themes of elections, in which community-based activities are the most active in the process of reform processes, it is precisely the groups of citizens who can protest to develop a genuinely democratic local context. Another macro-theme that can be identified among spontaneous groups of citizens is that of sustainable finance geared more to erasing inequalities, also associated with the management and management aspect of the courts with a pressure to change the approach of judges by increasing technologies and changing the law concerning the evolution of the social context. Sweden continues the democratization process of the rest of the world as well. The last issue associated with the government is COVID which has seen the need to involve the most significant number of people in the vaccination process; this has entailed on the one hand, the launch of a computerized and online management system, and on the same time the future need for innovative performance systems to evaluate intervention projects with such large dimensions.

Country

The attention of many countries continues to be focused on establishing anti-corruption systems. The issue is more significant following the amount of funding and decisions made by the various states during and after the spread of COVID-19. This theme is significantly associated with crimes and cases of money laundering through businesses. The change in the legal system and attention to forms of control over the financing of terrorism requires the involvement of citizens. Another significant issue concerns the protection and rights of immigrants and war refugees. Among the main clusters associated with the country, the word government with the search by the European Community for new policies aimed at equality between women and men.

Local

Citizen involvement is required in particular on aspects that have become significant in recent years, including the relationship between well-being and healthy eating. Furthermore, the pandemic crisis has brought out the difficulty in managing the services that currently deal with mental problems. The analysis is required to identify new approaches to crisis management, risk management, and involvement of family work activities to reduce the number of suicides.

Place

Among the most virtuous states oriented to citizen participation and attention to the needs of the community, we can find Spain, which tries to identify, thanks to a collaborative approach, the best possibilities to face climate change and the use of water in collaboration with the World Meteorological Organization also through the construction of a standard information system. The presentation of the results in Sweden plays a role in promoting good practices around the world.

Rights

The analysis identifies the human rights following the war in Russia among the main topics addressed. In particular, freedom of speech and protest are the main issues in the Russian territory, where the inhabitants suffer a double limitation of movement within the borders. In particular, through its agents and other means, Russia has initiated the persecution of those who are against the regime by eliminating political opponents and NGO leaders.

To promote rights, the House of Citizens identifies as a model not only the elected subjects but also professionals (academics, scientists, businessmen, and artists) among the subjects to be involved in bringing about social change.

Body

The issue of rights is associated with that of the protection of the body in particular projects and benefits that should be more developed for disabled people.

Projects

Projects involving cities aimed at becoming smart can change the currently active system, and new models of involvement and public consultations are also needed to involve citizens. France is the leading country currently interested in addressing the issue, last year through “Best Practice for Citizen Engagement” carried out in Barcelona (Spain).

References:

Brescia, V. (2020). Smart City E Citizen Participation. Strumenti, Governance e Performance (Vol. 10, pp. 1-260). G. Giappichelli Editore.

Dal Mas, F. (2019). The relationship between intellectual capital and sustainability: An analysis of practitioner’s thought. In Intellectual capital management as a driver of sustainability (pp. 11-24). Springer, Cham.

Massaro, M., Secinaro, S., Dal Mas, F., Brescia, V., & Calandra, D. (2021). Industry 4.0 and circular economy: An exploratory analysis of academic and practitioners' perspectives. Business Strategy and the Environment, 30(2), 1213-1231.

Secinaro, S., Dal Mas, F., Brescia, V., & Calandra, D. (2021). Blockchain in the accounting, auditing and accountability fields: a bibliometric and coding analysis. Accounting, Auditing & Accountability Journal.

Secinaro, S., Dal Mas, F., Massaro, M., & Calandra, D. (2021a). Exploring agricultural entrepreneurship and new technologies: academic and practitioners' views. British Food Journal.

Secinaro, S., Brescia, V., Lanzalonga, F., & Santoro, G. (2022). Smart city reporting: A bibliometric and structured literature review analysis to identify technological opportunities and challenges for sustainable development. Journal of Business Research, 149, 296-313.

Smith, A. E., & Humphreys, M. S. (2006). Evaluation of unsupervised semantic mapping of natural language with Leximancer concept mapping. Behavior research methods, 38(2), 262-279.

Strokosch, K., & Osborne, S. P. (2020). Debate: If citizen participation is so important, why has it not been achieved?. Public Money & Management, 40(1), 8-10.

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

Difference between Gender Equality and Gender Diversity in Board of Directors. What do you Mean a European Overview? A Literature Review

Stefano De Nichilo

Lectures University of Cagliari, e-mail: stefanodenichilo1985@gmail.com

Abstract
The number of women in the boards of directors has increased in a lot in international firms, in recent years, with the help of the gender quotas, but we do not know whether this fact leads to an increase in gender equality. Based on a literature review about gender diversity, business performance and perceived gender equality, the present research investigates if perceived gender equality is present in the European Union and other country, which are subjected to mandatory gender quotas, analyzing if differences between men and women exist. This paper contributes to expand the literature review emphasizing the relevance to identifying the presence of gender equality, to a better understanding of the perceptions within the boards of directors and to the differences between the two genders.

Keywords: gender equality, gender quotas, gender diversity, performance, gender studies, board of directors.

Doi: 10.5281/zenodo.6849668

1. Introduction to gender equality and gender diversity

Gender equality or gender egalitarianism, which differs from the concept of gender diversity, can be defined as "the degree to which an organization or society minimizes gender role differences (while promoting gender equality)" (House et al., 2004). The expression has assumed considerable importance in the XXI century following the greater attention to the issues of equal treatment between genders and the removal of obstacles which, in fact, make it more difficult for one of the two genders to participate in economic, social or politic life of the society (DeNichilo 2021). Gender equality, one of the founding elements of the European Union (EU) politics, is mentioned in various Community provisions such as, for example, the Charter of Fundamental Rights and in numerous treaties.

Diversity, in general terms, can be defined as "any significant difference that distinguishes one person from another" (Kreitz, 2007); gender diversity, specifically, represents one of the dimensions of diversity, and can be inserted among the so-called "primary dimensions" (which include, in addition to gender, age, sexual orientation, etc.), which are assumed to be static throughout the life of each individual, and the "secondary dimensions" (among which the level of education can be placed), which instead are characterized by a more or less marked variability over a lifetime (Loden & Rosener, 1991).

Masculinity is associated with a more intense search for success and income, and therefore for competitiveness, while femininity is associated with characteristics such as collaboration, modesty and quality of life, as well as social acceptance. This distinction assumes peculiar characteristics in managerial contexts at country level. In fact, in countries with a stronger "masculine" connotation (for example the United States, Japan, Italy, etc.) there will be a greater orientation towards remuneration and professional ambition and status, while in those with a stronger connotation "feminine" (Sweden, Norway, Denmark, etc.) human relations and cooperation will prevail. The concept of gender egalitarianism has its origins in Hofstede's studies (1984, 2011) and was

introduced for the first time by House et al. (2004). With this expression these authors indicate the level of equality between women and men within a society.

In societies with a higher level of gender equality, women are given a more prominent role, which is manifested, for example, in a high number of women in the labor market and in positions of power, while in companies with a low-level woman have less power, understood both in terms of leadership positions and the possibility of influencing decision-making processes (House et al., 2004).

The introduction of gender quotas within the boards of directors of European listed companies has brought deep changes in the corporate governance of these companies (Lenard, Yu, York and Wu, 2014). After the introduction of the concept of corporate governance, a brief examination will be made of some of the most well known corporate governance theories, putting them in relation to the gender diversity in the boards of directors (Gul, Hutchinson and Lai, 2013). A comparative analysis will then be carried out between European listed companies, chosen taking into consideration some European country (Joshi, Son and Roh, 2015). Stakeholder theory, in particular, will be used to highlight how those companies subject to mandatory gender quotas have indeed met the expectations of the stakeholders interested in gender diversity on the boards of directors more formally than substantially (Sila, González and Hagendorff, 2016). This paper contributes to expand the literature review about corporate governance and gender diversity, understanding the differences between companies subject to the quotas and companies that are not (Gul, Hutchinson and Lai, 2013).

The paper is so structured: institutional settings of legislation on gender diversity and gender equality in Europe; follows methodology, results and conclusion.

Institutional settings: Legislation on gender diversity and gender equality in Europe

The EU, through its own institutions (Parliament, Commission and Council), has always placed the concepts of diversity and gender equality on the boards of directors and in the boards of statutory auditors of companies at the center of its main objectives, considering them fundamental for the growth, the development and the competitiveness of the entire Community. Gender equality, as well as being one of the most important principles of the Charter of Fundamental Rights of the EU (2000), is also indicated in two important treaties of the European Union: the Maastricht Treaty (articles 2 and 3) and the Treaty on the Functioning of the EU (articles 8 and 153). In the Charter of Fundamental Rights of the EU, gender equality (article 23) and the prohibition of discrimination based on sex (article 21) are of particular relevance.

Diversity is mentioned in the Green Paper - Corporate governance in financial institutions and remuneration policies of the European Commission (2011), in which its importance is emphasized as a precondition to facilitate discussions and qualitative improvement of decisions, both within the boards of directors and within the boards of auditors. It also states that the main positive effect of the female presence within them is given by the increase in the number of talents that companies have at their disposal for upper management. The Action Plan of the European Commission (2012) also states that diversity is essential to prevent group thinking, which generates a uniform thought within the decision-making and control bodies, without taking into consideration the possibility that potential heterogeneous thoughts and/or ideas exist within it (Rose, 2011).

On the basis of a range of actions, the EU has therefore identified some areas on which to act to improve gender equity. In the European Strategy for equality for 2010-2015, followed by the European Pact for gender equality 2011-2020 of the European Council, for example, five areas of

relevance have been identified, among which the Equality in decision-making assumes a central importance.

In the European Pact for Gender Equality 2011-2020 the commitment of the Member States in the areas identified by the previous documents is reaffirmed, such as in the reduction of differences in work, education and social protection, the reconciliation of work and family life, the representation of women in decision-making processes and the fight against gender-based violence (Women CEO La Diversidad de Género en los Consejos del IBEX-35, 2017). Another of the EU's key measures is the Europe strategy 2020: A strategy for smart, sustainable and inclusive growth (2010), adopted to promote growth and employment of the Member States. Among the main objectives there is the female employment and, therefore, the greater participation of women in the world of work. The state of implementation of the policies implemented by the individual Member States is monitored every six months, and it is for this reason that the term "European semester" has been introduced to indicate that process of alignment of economic and budgetary policies with the objectives and the standards defined at EU level (DeNichilo 2021).

2. Methodology

The number of women in the boards of directors has increased in a lot in international firms, in recent years, with the help of the gender quotas, but we do not know whether this fact leads to an increase in gender equality (Daily and Dalton, 2003). Based on a literature review about gender diversity, business performance and perceived gender equality, the present research investigates if perceived gender equality is present in the European listed companies, which are subjected to mandatory gender quotas, analyzing if differences between men and women exist. Using an exploratory study based on literature review on the perceived gender equality and diversity by the board members of the European listed companies, assuming that there will be significant differences between men and women directors (European Commission, 2016-2019).

3. Result

3.1 Literature review of gender quotas in the EU member states

The gender quotas have been introduced in many countries for just over fifteen years. There are two types of them: the so-called soft quotas and the binding quotas (also called hard quotas).

The first nation to introduce them voluntarily was Norway (2003); the goal was to bring the percentage of each gender to at least 40% by 2008. Despite the good results achieved[85], however, the law became mandatory, starting in 2006, providing for a percentage of women equal to 40% of the members of the board of directors (Leszczynska, 2018). A study of Kogut et al. (2014) reiterates the importance of the mandatory introduction of gender quotas, as this would be able to create a critical mass within the board so that, once the law will lapse, the number of women would still be enough high and, therefore, fair with respect to that of men.

Table 1 shows the mandatory gender quotas in the boards of directors of the EU listed companies. Source: Our Elaboration.

Mandatory gender quotas in the boards of directors of the EU listed companies		
Country	***Quota: Yes or no***	***Description***
Austria	*Yes*	*The law, which came into force in 2018, is valid for the listed companies and companies with more than 1000 employees. It requires that both genders are represented by a minimum percentage of 30%.*
Belgium	*Yes*	*The quota (33%) involves both executive and non executive managers of three groups of companies: listed, state-owned companies and small-medium sized listed companies. For the first two the goal to be achieved is by 2017, for the latter by 2019. No sanctions are identified.*
Bulgaria	*No*	
Croatia	*No*	
Cyprus	*No*	
Czech Republic	*No*	
Denmark	*No*	
Estonia	*No*	
Finland	*No*	
France	*Yes*	*The quota (40%) applies to the boards of large companies, both listed and unlisted, only to non executive managers. The goal must be achieved by 2017.*

Germany	*No*	*The existing quotas are mandatory for the supervisory bodies (supervisory board, board of auditors and internal committee for management control)*
Greece	*Yes*	*The quotas (33%) applies to those companies which are totally or partially controlled by the State. It concerns the whole Board of Directors, without distinction between executive and non executive members.*
Hungary	*No*	
Irland	*No*	
Italy	*Yes*	*The law, introduced in 2011, requires a quota (20%) by 2012 and 33.33% by 2015. The companies involved are listed and unlisted public companies. As in Greece, it concerns the Board of Directors as a whole, without distinction between executive and non executive members.*
Latvia	*No*	
Lithuania	*No*	
Luxembourg	*No*	
Malta	*No*	
Netherlands	*Yes*	*The law requires a 30% quota by 2016. There is a "comply or explain" mechanism, without sanctions. In fact, it is a "soft quota".*
Poland	*No*	

Portugal	*Yes*	*Law introduced in 2017 (Law 62/2017), valid for listed companies and state-owned companies. For the former, from the first elected assembly, the quota is 20% from January 2018 and 33% from January 2020. It applies only to renewals and/or replacements and not to current mandates.*
Romania	*No*	
Slovakia	*No*	
Slovenia	*No*	
Spain	*Yes*	*The quota, to be reached by 2015, is 40% and is valid for both executive and non-executive directors. It applies to large private or public companies that have certain dimensional parameters. There are no sanctions, and they are in fact comparable to the "soft quotas".*
Sweden	*No*	
UK	*No*	

3.2 Gender diversity within the boards of directors: The relationship with the performances

Gender is one of the most important demographic attributes, as well as one of the most easily observed (Erhardt et al., 2003) and most studied in the literature (Hillman, 2015). Adams et al. (2015) distinguish three groups of diversity: the so-called task-related diversity (which includes, for example, the educational and functional background), the non-task-related diversity (which includes more objective variables, such as gender, the age, race, etc.) and structural diversity (for example the degree of independence of the board of directors and the CEO duality). In studies related to non-task-related diversity, which includes many demographic variables, it is often assumed that the latter are able to deeply influence the members of the board of directors, in relation to characteristics such as their knowledge, their behavior, their decision-making process and, last but not least, the company's performance (Forbes and Milliken, 1999).

The literature about the link between gender diversity on boards of directors and performances shows widely divergent results. Three recent reviews (Kirsch, 2017; Post & Byron 2015; Pletzer et al. 2015) indicate that many studies identify a positive (or non-existent) relationship between gender diversity on board and performance. One of the most recent reviews (Cabrera-Fernández et al., 2016) has

analyzed the various studies on the subject, noticing the presence of positive, negative or neutral results. In fact, other studies have identified a negative relationship between an increase in gender diversity and performance (Adams & Ferreira, 2009). This last study, while demonstrating that the female presence improves the functioning of the boards, shows a negative relationship between the presence of women within the boards and the value of companies, measured through Tobin's Q. The authors, therefore, while not demonizing the presence of women, affirm that a greater number of women board members would be more appropriate in societies characterized by a weak governance, as they would be able to exercise a greater control activity (DeNichilo 2020).

The link between the characteristics of the board members and the performances is not easy to understand, also because gender represents only one of their numerous characteristics (Johnson, Ellstrand & Daily, 1996; Withers et al., 2012). Furthermore, the diversity within the board is influenced by other variables, such as the size of the company, the sector which it belongs to and other characteristics related to corporate governance (Carter et al, 2003). Furthermore, gender studies are mainly focused on northern Europe, while few analyzes have been conducted with reference to Southern Europe (Paoloni, Demartini, 2016). Despite numerous studies (Amore et al., 2014; Ararat et al., 2015; Campbell & Minguez-Vera, 2008; Carter et al., 2003; Erhardtet al., 2003; Francoeur, Labelle & Sinclair, 2008; Garçia-Meca et al., 2015; Isidro & Sobral, 2015; Joecks et al., 2013; Liu et al., 2014; Low et al., 2015; Lückerath-Rovers, 2013; Mahadeo & Soobaroyen, 2012;Nguyen et al., 2015; Ntim & al., 2015; Reguera-Alvarado et al., 2017; Salloum et al., 2019; Smith et al., 2006; Terjesen et al., 2016) identify a positive relationship beetwen them, other show a negative relationship (Adams & Ferreira, 2009; Bøhren, & Strøm, 2010; Shrader et al., 1997) or a non-existant relationship between them (Carter et al., 2010; Chapple & Humphrey, 2013; Farrell & Hersch, 2005; Gregory et al., 2014; Miller & Triana, 2009; Randøy et al., 2006; Rose, 2007).Some studies also show bivalent relationships (Bonn et al., 2004; Dobbin & Jung, 2011).Table 3 shows the previous studies classified by author, nationality of the companies, performance indicators and value of the relationship.

Table 3 – Studies about the relationship between gender diversity in the board of directors and performances. Source: Our Elaboration.

Studies about the relationship between gender diversity in the boards of directors and performances			
Author(s)	***Nationality of the companies***	***Performance indicators***	***Value of the relationship***
Adams and Ferreira (2009)	*USA*	*ROA, Q di Tobin*	*Negative*
Amore et al. (2014)	*Italy*	*ROA*	*Positive*
Ararat et al. (2015)	*Turkey*	*ROE, Market-to-book*	*Positive*
Bøhren & Strøm (2010)	*Norway*	*ROE, ROS, Q di Tobin*	*Negative*

Bonn at al. (2004)	*Japan and Australia*	*ROA, Market-to-book*	*Positive (Australia) No relation (Japan)*
Bruno et al. (2018)	*Italy*	*ROA, ROE, ROIC, ROS*	*Positive*
Campbell & Vera (2008)	*Spain*	*Q di Tobin*	*Positive*
Carter et al. (2003)	*USA*	*ROA, Q di Tobin*	*Positive*
Carter et al. (2010)	*USA*	*Q di Tobin, ROA*	*No relation*
Chapple and Humphrey (2014)	*Australia*	*Q di Tobin*	*No relation*
Dobbin and Jung (2011)	*USA*	*ROA, Q di Tobin*	*Negative (Tobin's Q) No relation (ROA)*
Erhardt et al. (2003)	*USA*	*ROA, ROI*	*Positive*
Farrell and Hersch (2005)	*USA*	*Total Shareholder Return*	*No relation*
Francoeur et al. (2008)	*Canada*	*ROE, Market-to-book*	*Positive*
García-Meca et al. (2015)	*Various Countries*	*Q di Tobin e ROA*	*Positive*
Gordini and Rancati (2017)	*Italy*	*Q di Tobin*	*Positive*
Gregory-Smith et al. (2014)	*UK*	*Total Shareholder Return, ROA, ROE, Q di Tobin*	*No relation*
Isidro and Sobral (2015)	*Various Countries*	*Q di Tobin, ROA, ROS*	*Positive*
Joecks et al. (2013)	*Germany*	*ROE*	*Positive*
Liu et al. (2014)	*China*	*ROA, ROS*	*Positive*

Low et al. (2015)	*Hong Kong South Korea Malaysia Singapore*	*ROE*	*Positive*
Lückerath-Rovers (2013)	*Netherlands*	*ROE, ROS, ROIC*	*Positive*
Mahadeo et al. (2011)	*Mauritius*	*ROA*	*Positive*
Miller and Triana (2009)	*USA*	*ROI, ROS*	*No relation*
Nguyen et al. (2015)	*Vietnam*	*Tobin's Q*	*Positive*
Ntim (2015)	*South Africa*	*Tobin's Q, ROA, Total Shareholder Return*	*Positive*
Randoy et al. (2006)	*Pakistan*	*EVA*	*No relation*
Reguera-Alvarado et al., (2017)	*Spain*	*Tobin's Q*	*Positive*
Rose (2007)	*Denmark*	*Tobin's Q*	*No relation*
Shrader et al. (1997)	*USA*	*ROE, ROS, ROI, ROA*	*Negative*
Smith et al. (2006)	*Denmark*	*Gross profit Net revenues, Contribution margins*	*Positive*

Table 4 – Explanation Performance Indicators. Source: Our Elaboration.

Proxy	**Explanation Performance Indicators**
ROA	*The ROA (Return on Asset) is a profitability index given by the ratio between the EBIT and the company's total assets.*
Q di Tobin	*Tobin's q (or the q ratio, and Kaldor's v), is the ratio between a physical asset's market value and its replacement value.*
ROE	*The ROE (Return on Equity) is a profitability index given by the ratio between net income and equity.*

Market-to-book	*The market-to-book ratio is given by the ratio between the market value and the book value of a company's equity.*
ROS	*The ROS (Return on Sales) is a profitability index given by the ratio between operating profit and turnover.*
ROI / ROIC	*The ROI (Return on Investment or ROIC, Return on Invested Capital) is a profitability index given by the ratio between operating profit and invested capital. The ROIC differs from ROI in that it includes figurative taxes.*
Total Shareholder Return	*The TSR (Total Shareholder Return) is calculated by adding the dividends per share paid in a given period of time to the increase in the bond's price in the same time.*
EVA	*The Economic Value Added (EVA) is given by the difference between the operating income and the relative cost of capital used for its achievement.*
Gross profit Net revenues, Contribution margins	*Smith (2006) uses four indicators: Gross value added/turnover, Profit on primary operations/turnover, Ordinary result/net assets, Net result after tax/net assets.*

Pletzer et al. (2015) also confirm that a greater presence of women within the boards of directors is neither linked to a higher nor to a lower performance. These results corroborate those studies that associated greater diversity with better performance. However, the study states that gender diversity should be promoted for ethical purposes, regardless of company performance. Other studies have instead shown that it is not so much the presence of one or more women on boards to influence the value of the company, but it is the fair balance between men and women (understood in terms of greater gender diversity) to play a key role (Campbell, Mìnguez-Vera, 2008).

4. Discussion and Conclusion

One of the most important studies on gender diversity within groups (and, in the case, the boards of directors) is the one of Kanter (1977), who introduced the concept of tokenism. This term refers to the fact that the very small number of women has a negative effect on performance. This happens because minorities become victims of discriminatory behavior, invalidating their ability to influence the decision-making process of the group as a whole. Konrad et al., (2008) affirm that the presence of women is "normalized" when it reaches the threshold (critical mass) of at least three members within the board of directors; the study indicates that the contribution that women are able to make becomes more effective when three or more women are part of it, because in this way they are able to "speak and give their contribution more freely".

An important factor to be taken into consideration is the level of perception (and the related opinion) on the part of the individuals affected by the mandatory quotas (DeNichilo 2022). In this regard, a study was carried out on the perception of gender quotas by directors (Wiersema, Mors, 2016), who noted that they are perceived negatively in the countries where they have not yet been adopted (for

example in the USA and Denmark), while in those in which they are already in force there has been an evolution of opinions following their introduction (from negative to positive, as happened in Norway). From the interviews carried out emerges, in particular, the theme of meritocracy, which would be damaged by the imposition of quotas. In countries that adopt quotas, on the other hand, there would be greater satisfaction for the increase in diversity within the boards and for the considerable improvements in the selection processes of directors.

Other studies (Moeykens, Everaert, 2011) state that women on boards and gender diversity do not have negative effects on corporate profits, and that "the only argument for the increase of gender diversity is of social and ethical nature". The appointment of more women would therefore be appropriate, but the question "competent manager or token?" remains open (Burgess et al., 2002). Gender quotas objectively represent a great opportunity for studying diversity within the boards: imposing that a given number of women (or, as required by Italian legislation, the least represented gender) is at least equal to a certain percentage on the total, a group of entities (companies) are created that have the same characteristics, at least in percentage terms.

Women continue to face numerous obstacles in their career, but significant progress has been made in recent years., not only in terms of participation in the workforce but also in skills and education. With the support of numerous institutions, both public and private, there has been a change in both social and cultural norms within the labor markets, in particular in those of the most developed countries (Bebchuk, Fried and Walker 2002b). In the latter, in fact, there has been a reduction in gender inequalities, which however continue to persist in global labor markets; indeed, the most important problems include discrimination and segregation, as well as differences in terms of wages and opportunities. In the firs we taking into consideration some key factors identified capable of increasing or not the female participation in the labor markets (Bebchuk, Fried and Walker, 2002a). Then we have tried to analyze characteristics such as the gender inequalities, the relevance of labor gender equality to economic growth, the educational competences achieved by women, the gender wage gap and the public policies provided to promote gender equality. For this and, in order to study the changes that took place in the most developed countries women's participation in labor markets and the relation with economic growth rates, educational competences achieved, the gender wage gap and women and the gender gap in management were taken into account (Bebchuk and Fried 2003).

Gender quotas have been a useful tool to increase the number of women on the boards of directors of listed companies, but they do not yet seem to represent the solution to ensure that women can be better represented in top positions; however, they were able to create a "fertile ground" for women, increasing their access to leadership positions (Ahern and Dittmar, 2012). In the European context, therefore, it would seem that gender quotas should be further improved, trying to integrate the "business utility case" logic, widely studied in recent years, with that of "social justice arguments", adapting them to the European context and actors (Adams, Nowland, and Grey, 2011).

References

Adams, R. B., Haan, J., Terjesen, S., van Ees, H. (2015). Board diversity: moving the field forward. Corporate Governance: An International Review, 23(2), 77-82.

Adams, R.B., Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. Journal of financial economics 94 (2), 291- 309.

Adams, R. B., Nowland, J., and Grey, S. (2011). Does Gender Matter in the Boardroom? Evidence from the Market Reaction to Mandatory New Director Announcements. Available online at SSRN: http://ssrn.com/abstract=1953152

Ahern, K. R., and Dittmar, A. K. (2012). The changing of the boards: the impact on firm valuation of mandated female board representation. Q. J. Econ. 127, 137–197. doi: 10.1093/qje/qjr049

Amore, Garofalo, Minichilli (2014), Gender Interactions Within the Family Firm, Management Science 60(5), 1083–1097.

Ararat, M., Aksu, M. Cetin, A. (2015), "How board diversity affects firm performance in emerging markets: evidence on channels in controlled firms", Corporate Governance: An International Review, 23 (2), 83- 103.

Bebchuk, L., and Fried, J. M. (2003). Executive compensation as an agency problem. J. Econ. Perspect. 17, 71–92. doi: 10.1257/089533003769204362

Bebchuk, L. A., Fried, J. M., and Walker, D. I. (2002a). Management and control of the modern business corporation: executive compensation & takeovers: managerial power and rent extraction in the design of executive compensation. U. Chi. L. Rev. 69, 751–2057. doi: 10.2307/1600632

Bebchuk, L. A., Fried, J. M., and Walker, D. I. (2002b). Managerial power and rent extraction in the design of executive compensation (No. w9068). Natl. Bur. Econ. Res. doi: 10.3386/w9068

Bøhren, Ø. Strøm, R.Ø. (2010), "Governance and politics: regulating independence and diversity in the board room", Journal of Business Finance and Accounting, 37(9-10), 1281-1308

Bonn, I., Yoshikawa, T., Phan, P. H. (2004). Effects of board structure on firm performance: A comparison between Japan and Australia. Asian Business & Management, 3, 105–125

Burgess, Z.; Tharenou, P. (2002). Journal of Business Ethics, 37(1), 39–49. doi:10.1023/a:1014726001155

Cabrera-Fernández A. I., (2016), "Women's participation on boards of directors: a review of the literature", International Journal of Gender and Entrepreneurship, Vol. 8 Iss 1 pp. 69-89 http://dx.doi.org/10.1108/IJGE-02-2015-0008

Campbell, K., Mínguez-Vera, A. (2008), "Gender diversity and firm financial in the boardroom performance", Journal of Business Ethics, Vol. 83 No. 3, pp. 435-451.

Carter, D. A., B. J. Simkins, W. G. Simpson (2003). "Corporate governance, board diversity, and firm value." Financial Review 38(1): 33-53.

Carter, D. A., D'Souza, F., Simkins, B. J., Simon, W. G. (2010). The gender and ethnic diversity of US boards and board committees and firm financial performance. Corporate Governance: An International Review, 18(5), 396–414

Chapple, L., Humphrey, J.E. (2013), "Does board gender diversity have a financial impact? Evidence using stock portfolio performance", Journal of Business Ethics, 122(4), 709-723.

DeNichilo, S. (2020). Public Choice in European Affairs: Measuring Election Model. European Journal of Social Impact and Circular Economy pp 19-37. Published by University of Turin 2020.

DeNichilo S. (2021), Management Accounting in European Finance for Smart Tourism and Sustainable Destination: How Organizations Deficiency? Pp 45-74. Published by University of Turin. http://www.ojs.unito.it/index.php/ejsice/index.

DeNichilo S. (2021), Management Accounting in European Affairs: a Memorandum Methodology for Formalize Audit Evidence. Corporate Governance and Research & Development Studies 1/2021. DOI: http://dx.doi.org/10.3280/cgrds1-2021oa10445.

DeNichilo S. (2022), How to resolve audit matters in European Affairs? Introduction to a sustainable management accounting under IAS 37. Pp 27-42. Published by University of Turin. http://www.ojs.unito.it/index.php/ejsice/index.

Daily, C. M., and Dalton, D. R. (2003). Women in the boardroom: a business imperative. J. Bus. Strat. 24, 8–9. doi: 10.1108/jbs.2003.28824eaf.002

Dobbin, F., Jung, J. (2011), "Corporate board gender diversity and stock performance: the competence GAP or institutional investor bias?", North Carolina Law Review, Vol. 89 No. 3, pp. 809-838.

Erhardt, N.L., Werbel, J.D., Shrader, C.B. (2003), "Board of director diversity and firm financial performance", Corporate Governance, Vol. 11 No. 2, pp. 102-111.

European Commission (2016-2019). Strategic Engagement for Gender Equality. Available online at: http://ec.europa.eu/justice/gender-equality/document/files/strategic_engagement_en.pd

Farrell, Kathleen A., Hersch, Philip L., (2005), Additions to corporate boards: the effect of gender, Journal of Corporate Finance, 11, issue 1-2, p. 85-106.

Forbes, D., Milliken, F. (1999). Cognition and Corporate Governance: Understanding Boards of Directors as Strategic Decision-Making Groups. The Academy of Management Review. 24. 10.2307/259138.

Francoeur C., Labelle R. Sinclair-Desgagné B., (2008), Gender Diversity in Corporate Governance and Top Management, Journal of Business Ethics, 81, issue 1, p. 83-95

García-Meca, E., García-Sánchez, I. Martínez-Ferrero, J. (2015), "Board diversity and its effects on bank performance: an international analysis", Journal of Banking & Finance, Vol. 53, pp. 202-214.

Gregory-Smith, I., Main, B.G.M., O'Reilly III, C.A. (2014) Appointments, Pay and Performance in UK Boardrooms by Gender. Economic Journal, 124 (574). F109 - F128. ISSN 0013-0133

Gul, F. A., Hutchinson, M., and Lai, K. M. (2013). Gender-diverse boards and properties of analyst earnings forecasts. Account. Horizons 27, 511–538. doi: 10.2308/acch-50486

Hillman, A.J. (2015), "Board diversity: beginning to unpeel the onion", Corporate Governance: An International Review, 23(2), pp. 104-107.

Hofstede, G. (1984). Culture's consequences: International differences in work-related values. Newbury Park, CA: Sage.

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. Online Readings in Psychology and Culture, 2(1). https://doi.org/10.9707/2307-0919.1014

House R.J. et al. (2004), Culture, Leadership, and Organizations: The GLOBE Study of 62 Societies. Thousand Oaks, CA: Sage.

Hutchinson, M., Mack, J., and Plastow, K. (2015). Who selects the "right" directors? An examination of the association between board selection, gender diversity and outcomes. Account. Finance 55, 1071–1103. doi: 10.1111/acfi.12082

Isidro, H. Sobral, M.(2015). The Effects of Women on Corporate Boards on Firm Value, Financial Performance, and Ethical and Social Compliance. Journal of Business Ethics 132 (1):1-19.

Joecks, J., Pull, K. Vetter, K. (2013), "Gender diversity in the boardroom and firm performance: what exactly constitutes a 'critical mass?", Journal of Business Ethics, Vol. 118 No. 1, pp. 61-72.

Johnson, J. L., Daily, C. M., Ellstrand, A. E. (1996). Boards of Directors: A Review and Research Agenda. Journal of Management, 22(3), 409–438.

Joshi, A., Son, J., and Roh, H. (2015). When can women close the gap? A meta-analytic test of sex differences in performance and rewards. Acad. Manag. J. 58, 1516–1545. doi: 10.5465/amj.2013.0721

Kanter, R. M. (1977). Men and women of the corporation. New York: Basic Books

Kirsch, A. (2017), The gender composition of corporate boards: A review and research agenda. Leadership Quarterly [https://doi.org/10.1016/j.leaqua.2017.06.001]

Kogut, B., Colomer, J., and Belinky, M. (2014). Structural equality at the top of the corporation: Mandated quotas for women directors. Strategic Management Journal, 35(6): 891-902.

Konrad, et al., (2008). Critical Mass:: The Impact of Three or More Women on Corporate Boards. Organizational Dynamics. 37. 145–164. 10.1016/j.orgdyn.2008.02.005.

Kreitz, P. A. (2007). Best Practices for Managing Organizational Diversity. The Journal of Academic Librarianship. 34. 101-120. 10.1016/j.acalib.2007.12.001.

Lenard, M., Yu, B., Anne York, E., and Wu, S. (2014). Impact of board gender diversity on firm risk. Manag. Finance 40, 787–803. doi: 10.1108/MF-06-2013-0164

Leszczyn, M. (2018). Mandatory Quotas for Women on Boards of Directors in the European Union : Harmful to or Good for Company Performance ? European Business Organization Law Review, 19(1), 35–61. https://doi.org/10.1007/s40804-017-0095-x

Liu Y., Wei Z. Xie F., (2014), Do women directors improve firm performance in China?, Journal of Corporate Finance, 28, (C), 169-184

Loden, M., Rosener, J.B., (1991). Workforce America! Managing Employee Diversity as a Vital Resource. Illinois: Business One Irwin.

Low D.C.M.; Roberts H. Whiting R. H., (2015), Board gender diversity and firm performance: Empirical evidence from Hong Kong, South Korea, Malaysia and Singapore, Pacific-Basin Finance Journal, 35, (PA), 381- 401

Lückerath-Rovers, M., (2013), "Women on boards and firm performance", Journal of Management and Governance, Vol. 17 No. 2, pp. 491-509.

Mahadeo J., Soobaroyen T., Oogarah-Hanuman V., (2011). Board Composition and Financial Performance: Uncovering the Effects of Diversity in an Emerging Economy. Journal of Business Ethics. 105. 375-388. 10.1007/s10551-011-0973-z.

Miller, T. del Carmen Triana, M. (2009), "Demographic diversity in the boardroom: mediators of the board diversity-firm performance relationship", Journal of Management Studies, Vol. 46 No. 5, pp. 755 786.

Moeykens, D., Everaert P. (2011), Gender Diversity In Belgian Corporate Boards. Master of Science in Complementary Studies in Business Economics

Nguyen T., Locke S. Reddy Dr. (2015). Does boardroom gender diversity matter? Evidence from a transitional economy. International Review of Economics & Finance. 1-48. 10.1016/j.iref.2014.11.022.

Ntim, Collins G., Board Diversity and Organizational Valuation: Unravelling the Effects of Ethnicity and Gender (2015), Journal of Management and Governance, 19(1),167-195

OECD (2017). Report on the Implementation of the OECD Gender Recommendations. Paris: OECD Publishing. Available online at: http://www.oecd.org/mcm/documents/C-MIN-2017-7-EN.pdf

Paoloni, P. Demartini, P. (2016), Women in Management: Perspectives on a Decade of Research (2005–2015). Palgrave Communications, 2.

Pletzer J.N., Nikolova R., Kedzior K.K. S.C. Voelpel (2015) 'Does Gender Matter? Female Representation on Corporate Boards and Firm Financial Performance - A Meta-Analysis', PLOS-One.

Post C. Byron K. (2015) 'Women on Boards and Firm Financial Performance: A Meta-Analysis', Academy of Management Journal, 58(5), 1546–1571

Randøy, T., Thomsen, S., Oxelheim, L. (2006). A Nordic perspective or corporate board diversity. Nordic Innovation Centre.

Reguera-Alvarado, N., de Fuentes, P., Laffarga, J. (2015). Does board gender diversity influence financial performance? Evidence from Spain. J. Bus. Ethics, 1–14. 10.1007/s10551-015-2735-9

Rose, C. (2007), "Does female board representation influence firm performance? The Danish evidence", Corporate Governance, Vol. 15 No. 2, pp. 404-413.

Rose, J. D., (2011), Diverse perspectives on the Groupthink theory – a literary review. Emerging Leadership Journeys, 4(1), 37-57.

Salloum C., Jabbour G. Mercier-Suissa C., (2017), Democracy across Gender Diversity and Ethnicity of Middle Eastern SMEs: How Does Performance Differ?, Post-Print, HAL, https://EconPapers.repec.org/RePEc:hal:journl:hal-01472697.

Shrader, C. B., Blackburn, V. B., Iles, P. (1997). Women in management and firm financial performance: An explorative study. Journal of Managerial Issues, 9(3), 355–372.

Sila, V., González, A., and Hagendorff, J. (2016). Women on board: does boardroom gender diversity affect firm risk? J. Corp. Finance 36, 26–53. doi: 10.1016/j.jcorpfin.2015.10.003

Smith N., Smith V., Verner M.,(2006) "Do women in top management affect firm performance? A panel study of 2,500 Danish firms", International Journal of Productivity and Performance Management, Vol. 55Issue: 7, pp.569-593, https://doi.org/10.1108/17410400610702160

Terjesen, S., Couto, E.B. Francisco, P.M. (2016), "Does the presence of independent and female directors impact firm performance? A multi-country study of board diversity", Journal of Management & Governance, 20(3), 447-483.

Wiersema, M., Mors, L. (2016). What Board Directors Really Think of Gender Quotas. Harvard Business Review Digital Articles, 2-6.

Withers, M. C., Hillman, A. J., Cannella, A. A. (2012). A Multidisciplinary Review of the Director Selection Literature. Journal of Management, 38(1), 243–277.

Women CEO La Diversidad de Género en los Consejos del IBEX-35. (2017). Available online at: http://womenceo.es/wp-content/uploads/informe-WomenCEO-diversidad-consejos-direccion-2017.pdf

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

Impact of Covid-19 pandemic on physical activity and energy expenditure

Rabel Sundro

College of Physiotherapy, Jinnah Postgraduate Medical Centre Karachi, Pakistan, e-mail: rabelbalani@gmail.com

Abstract

Objective: The study was primarily conducted to find out the impact of COVID-19 pandemic on physical activity and energy expenditure among physiotherapy professionals and students.
Design and setting: A cross sectional study was conducted across various institutes of Karachi, Pakistan.
Subjects: Physical therapy students (n=264), and Physiotherapy Professionals (n=40).
Tool: The International Physical Activity Questionnaire- Short Form (IPAQ-SF) was used to evaluate levels of physical activity and energy expenditure before and during COVID-19 pandemic.
Results: Out of 420 surveys sent out, 308 surveys were returned showing response rate of 73%. The total physical activity was decreased (-28%) during pandemic (2136.8 MET-min/wk) as compared to physical activity before COVID-19 pandemic (3005 MET-min/wk). Also, the energy expenditure was decreased (-28.9%) during the pandemic (4151.6 MET-min/wk) as compared to before COVID-19 Pandemic (5831.4 MET-min/wk).
Conclusion: A significant reduction in physical activity and energy expenditure was reported from physiotherapy professionals and students during COVID-19 pandemic.

Keywords: Physical activity, Energy Expenditure, Physiotherapy professionals, Physiotherapy students, COVID-19 Pandemic

Doi: 10.5281/zenodo.6870784

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

1. Introduction

The novel COVID-19 part of (SARC-CoV-2) family was identified as pneumonia of unknown cause in Wuhan, China in December 2019 and then it has been spread to every country and different territories. The first clinical indication that led to discovery of SARS-COV-2 related disease COVID-19 was pneumonia. Later, the reports additionally depicted gastrointestinal symptoms and asymptomatic infections, particularly among young children. The virus was transmitted through close contact with the affected person or by touching the surface or object exposed to the virus. The most common symptoms of this virus are high fever, cold, dry cough, nasal congestion, bone pain and breathing problems. The infection advanced to serious illnesses including dyspnea and extreme chest symptoms related to pneumonia in around 75% of patients as figured by computed tomography (CT) while administered. Even the patients who were asymptomatic had become valid sources for transmitting the virus. It is known that a fragile population for example, the old or patients who are immune-suppressed or present with different comorbidities, are more prone to get exposed to severe coronavirus. The fatality rate of 4.47 times higher was reported in the population between 80 to 89 years as compared to those between 60 to 69 years in Italy. Hypertension, diabetes, and cardiovascular diseases were accounted for as the most frequent co-morbidities among patients with Corona virus requiring hospitalization.

Due to its rapid spread, the World Health Organization (WHO) declared the outbreak of COVID-19 as the sixth public health emergency of international concern (PHEIC) on 30th January 2020 and announced COVID-19 as pandemic on 11th march 2020. Globally 1,995,982 cases and 131,037 deaths were reported on 17th April 2020. A pandemic of this scale has never been seen since the Spanish Influenza during WWI, and has already created dramatic challenges all over the world in terms of economy, social interactions, and individual lifestyles. WHO warned nations to be prepared to face real challenges of COVID-19 due to the acceleration of pandemic. To protect the nation from drastic effects, the Government decided to seal the borders, shut down markets, institutions, schools, playgrounds and public places that still led to different side effects for the population.

Corona viruses are positive single stranded, enveloped large RNA viruses that infect people along with many animals. In 1966, they were first described by Tyrell and Byno, who cultivated the viruses from patients with common cold. Based on their morphology as spherical virions with a core shell and surface projections resembling a solar corona, they were termed corona viruses (Latin: corona = crown). They have four subfamilies; named as alpha, beta, gamma and delta corona virus that already exist. Alpha and beta are known to be arising from mammals specifically bats while gamma and delta arising from birds and pigs. The size of their genome varies between 26 kb 32 Kb. Considering the 7 subtypes of corona viruses that can infect humans; alpha corona viruses may cause asymptomatic or mildly symptomatic infections while the beta coronaviruses cause severe disease and fatalities. SARS-CoV-2 belongs to the B lineage of the beta coronaviruses and is closely related to the SARS-CoV virus. The major four structural

genes encode the nucleocapsid protein (N), the spike protein (S), a small membrane protein (SM) and the membrane glycoprotein (M) with an additional membrane glycoprotein (HE) occurring in the HCoV-OC43 and HKU1 beta-corona viruses. Like other coronaviruses, COVID-19 infects the host's cells utilizing a spike protein that connects to the angiotensin converting enzyme 2 (ACE2) receptors expressed on different human cells like the epithelial cells of the lung.

Pakistan is one the countries having highest rates of COVID-19 cases. On 26th February 2020, the first case of COVID-19 was reported in Karachi where the estimated population of Pakistan is 204.65 million. Within 45 days, on 10th April 2020, Pakistan's tally reached 4,601 cases, out of which only 727 patients recovered and 66 reported deaths. Because of unyielding effects of COVID-19, WHO provided an (SPRP) Strategic Preparedness and Response Plan to reduce further transmission of COVID-19. The plan included different approaches like Isolation and care of patients, reduction in social and economic impact through multispectral partnerships, risk communication and enhancement in the development of diagnostics, therapeutics and vaccines through priority innovation and research. Along with it, standard operating procedures (SOPs) were followed by every country to protect oneself from contact with the virus. It included standing at 6ft distance with people, washing hands, using sanitizers and wearing masks every time.

Due to limited follow ups and high transmission rate, there was still an increment in the COVID-19 cases that on 5th September 2020, the city of Karachi reported 84000 confirmed cases making up 28% of all cases present in Pakistan. On 28th October 2020, the government announced a second wave of COVID-19 in Pakistan, when a daily increase in cases reached 750 compared to 400 to 500 a few weeks ago. To control the rapid transmission, the lockdown was proposed to control and reduce the cases, which resulted in people working from home, taking classes' online, reduction in medical provision services or staying at home that led to lack of physical activity and energy expenditure among population and health care workers.

According to recent updates reported by the Government of Pakistan health advisory portal, till 28th May 2021 there were a total 854,240 confirmed cases of COVID-19 in all over Pakistan. Out of which 18,797 deaths and 752,712 recoveries have been reported. Among all regions, Sindh reported 290,756, Punjab reported 316,334 the highest confirmed cases of COVID-19, KPK 123,150 cases, Islamabad has 53,136, Balochistan has 23,186, and Azad Jammu Kashmir has 17763 while Gilgit Baltistan reported the least 5,367 cases. Though it's almost been more than a year since the virus first emerged, the majority of people are still getting exposed to the virus. The only way to reduce the virus from spreading is to have limitations on our daily life activities so we could hold back the virus. Also, to protect people from getting infected, inventing appropriate vaccines is the only way as they teach our bodies to fight the infection and is an only strategy to get rid of pandemic.

Beside hard challenges, world still managed to develop COVID-19 vaccine rapidly due to strong past researches on related virus and infections and quicker approaches to produce immunizations, vast funding that permitted firms to run numerous trials and experiments and regulators working more rapidly than normal like researchers from across the world are teaming up and introducing us various treatments, tests, and vaccines that hopefully will save huge lives. The developers of a few vaccines had declared outstanding outcomes in enormous preliminaries,

with more showing guarantee in the beginning of December. Also, on 2nd December, a vaccine made by drug giant Pfizer with German biotech firm BioNTech, turned into the first completely tried vaccination to be affirmed for emergency use. Recently, the big three - Pfizer/BioNtech, Moderna and Oxford/AstraZeneca vaccines are developed and have been approved for UK, US and Europe to use. The researchers in China have developed Sinovac, CanSino and Sinopharm vaccines and arrangements have been endorsed with different nations in Asia and South America. Sino pharm vaccine is estimated to be given to around 1,000,000 individuals in China.

The WHO, who is one of the heads of a worldwide alliance known as COVAX, the immunization pillar of the ACT-Accelerator collaboration, which is attempting to speed up the manufacturing a development of COVID-19 vaccines and guarantee that there is fair and impartial distribution to these vaccines for all nations. WHO's Strategic Advisory Group of Experts (SAGE) has given proposals about which population ought to be focused on first. These include our frontline health care workers who are at high risk of contamination, older adults, and those individuals who have co-morbidities like coronary illnesses, hypertension and diabetes as they are at high risk of death. In the second phase, as more vaccines are manufactured, they can be delivered to people having low risk of getting contaminated. Being immunized doesn't imply that we can pull out all the stops and put ourselves as well as other people in danger, especially on the grounds that it is as yet not satisfactory. Successful and effective vaccines will be a great transition but yet for a safe future to come we should not stop following SOPs and genuinely keep a distance, wear masks and stay away from crowded places.

The main journal of sport medicine and health in the world, the Editor-in-Chiefs and the Editorial Board shares an overview on the impact of COVID-19 and related physical inactivity on human health, and to share some physical activity guidelines to individuals suffering from the adverse outcomes during the pandemic and those recovering from an infection. Physical activity (PA) has demonstrated to be beneficial in improving clinical conditions that are most frequently associated with severe COVID-19. But due to the rise in the COVID-19 cases and fear of third wave, people have been ordered again to stay at home, and few countries have requested all returning travelers to self-isolate for a fourth-night. Each of these orders is proposed as a strategy to stop viruses from spreading further. While following guidelines, these actions are somehow adversely influencing people's physical activity behaviors, with additional time spent watching screens and subsequent impact on sleeping patterns, well-being and physical health. Decreased physical activity will lower mechanical load, energy expenditure, and metabolic rate which may result in a decline in physical fitness and an energy surplus. All are notable dangerous factors for future illness indications, forcing further financial burden on tomorrow's society.

A high level of sedentary behaviors with a lot of time spent on sitting and low levels of physical activity is related to increased risk of depression, cardiovascular diseases, type II diabetes and mortality rate. As it's a natural phenomenon that human physiology reacts rapidly to reduced physical activity. For instance, fourteen days of diminished physical activity prompts a decline in cardio respiratory wellness and multi-organ insulin sensitivity. One week of reduced step count significantly reduces myo-fibrillar protein synthesis rates and up regulated muscle atrophy in male adults by 91%. Also, only one week of induced sedentary behavior has adverse effects on depression and mood. Additionally, immobilization and sedentary behavior, such as TV viewing, are strong risk factors for venous thromboembolism. Despite what is generally

expected, regular physical activity and low sedentary time are related with low risk of morbidity and all-cause mortality.

The WHO recommends 150 minutes of moderate intensity or 75 minutes of vigorous intensity physical activity per week. The benefits of such periodic exercise are proven to be very helpful, especially in times of anxiety, crisis and fear. There are concerns therefore, in the context of the pandemic, lack of access to regular sporting or exercise routines may result in challenges to the immune system, physical health, including by leading to the commencement of or exacerbating existing diseases that have their roots in a sedentary lifestyle. Lack of access to exercise, physical activity and energy expenditure can also have mental health impacts, which can compound stress or anxiety. Meanwhile, individuals can be affected by multiple infections, drowsiness, lethargic, obesity and other psychological problems as well. Hence, this study is proposed to find out the impact on physical activity and energy expenditure in physiotherapy professionals and students due to COVID-19 pandemic.

2. Objective of the study

Main objective of the study is to determine the levels of physical activity and energy expenditure among physiotherapy professionals and students before and during COVID-19 pandemic.

3. Rationale of the study

The findings will be helpful to guide the physiotherapy professionals and students to stay physically active and do require energy expenditure.

4. Methodology

This section discusses the procedure used for this research. It includes study design, sampling, instrument used, data collection, data entry, data analysis, statistical tests used and description of statistical data.

4.1 Study Plan

At the beginning of the research thesis, we started with introducing the novel COVID-19 situation and how it is creating difficulties for people in everyday lives and further set up the study objectives, rationale and study plan. On the next step, we had the brief review of literature explaining how much covid-19 pandemic has affected physical activity and energy expenditure of people especially physiotherapists and physiotherapy professionals along with their mental health and made them more exposed to co-morbidities. In the third step, Researcher focused on framing a questionnaire which should be authentic and peer reviewed and made sure the questions are related to the study and easily answerable for the population. In the next step, the questionnaires were distributed to the targeted population. Then the data was analyzed by the questionnaire received back. The data analysis was done by the application of Statistical Package for the Social Sciences (SPSS) version 23. The last step included the results, discussion and recommendations.

The main objective of this study was to find out the impact of COVID-19 pandemic on physical activity and energy expenditure of physiotherapy professionals and students. This was a

questionnaire survey-based study and included close ended questions related to mild, moderate and vigorous physical activity before and during Covid-19 pandemic.

4.2 Study Design

This study is a cross sectional study which focused on finding out the impact of COVID-19 pandemic on physical activity and energy expenditure of physiotherapy students and professionals. The study design was chosen in regard to the current situation of COVID-19 and the study conduction was convenient, required less financial burden, time saving and described the benefits and effects of physical activity in the current pandemic situation.

4.3 Setting

The study was conducted in physiotherapy students and professionals from Jinnah postgraduate medical center, Dow Medical College, SBB Dewan University, Agha Khan Hospital, 3D lifestyle, Rabia Moon Trust, Liaquat National Hospital, Doctors Plaza, Ziauddin Medical University.

4.4 Study duration

The duration of study was 4 months.

4.5 Sample Size

It was estimated that keeping the 5% margin of error and 95% confidence interval, we need at least n= 300 samples. Our sample size was 308 subjects, that included Physiotherapy students and professionals= 268+40. A response rate of 73% was achieved. A total of 420 questionnaires were sent, out of which 308 were received.

4.6 Sampling Technique

Non probability convenience sampling was used for the study.

4.7 Sample Selection

The participants were randomly selected. The study's targeted population was all the physiotherapy professionals and students. Clinicians, academicians and researchers were also included in the study.

INCLUSION CRITERIA

- The age range between 18 to 60 years
- People who were physically active in daily routine

EXCLUSION CRITERIA

- People who were already physically inactive due to some illnesses.
- Physiotherapy professionals or students who were not willing to spare time to fill questionnaires.

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

4.8 Tool / Instrument

This is a questionnaire survey-based study so based on the International Physical Activity Questionnaire – Short Form (IPAQ-SF), the series of questions were developed for the survey to determine the physical activity and energy expenditure in the targeted population. The survey included 3 portions; the first section included questions regarding demographic data. Demographic related questions included in the survey were age, weight and gender. The second section included questions regarding physical activity before COVID-19 while the third portion consisted of questions related to physical activity after COVID-19 situation.

4.9 Validation of Questionnaire

The questionnaire used in this study is a short form of International Physical Activity Questionnaire (IPAQ-SF) which is already a validated survey tool. So the final survey through which data was conducted included 22 questions. Eight questions were related to demographics and contact information, seven questions of IPAQ-SF for evaluating physical activity and energy expenditure before COVID-19 pandemic and last seven questions of IPAQ-SF for evaluating physical activity and energy expenditure during COVID-19 Pandemic.

4.10 Data Collection Procedure

The researchers framed a questionnaire and informed consent for the participants and started collecting data by sending questionnaires online through social networking sites like Facebook, WhatsApp, and Instagram and also by face-to-face interview. The online survey was administered using the online survey portal, Google forms® (Online survey services). Overall, the feedback ratio was around 70% as many people avoided filling the form online. Data collection procedure was carried out by the permission of the department of Physiotherapy, Jinnah Postgraduate Medical Centre, Karachi. Consent form was signed before filling the questionnaire. All the queries that participants had were answered by the researcher.

4.11 Calculation of physical activity and energy expenditure:

A) Estimating Physical Activity Levels;

Following the IPAQ-SF, there were 4 categories provided to classify physical activity; Vigorous activity, moderate activity, walking and sitting. Utilizing the concept of Metabolic Equivalent (MET) here, the time spent in each of the above physical activity (in minutes) was multiplied with MET of the particular physical activity. In the same way, to calculate the MET utilized in a particular week, it was multiplied with the number of days a particular physical activity was performed. In this way, MET-min/wk were determined. For estimation, MET values which were recommended by the American college of Sports Medicine (ACSM) were used; vigorous activity – 8.0 METs; moderate activity – 4.0 METs sitting 1.5 METs; and walking – 3.3 METs.

B) Estimating Energy Expenditure Levels;

The levels of energy expenditure were measured in kilocalories. One kilocalorie is the amount of energy required to increase the temperature of 1 kg of water by 1 °C. The MET was converted into kilocalorie considering ACSM's formulae; 1 kcal/min = [(METs X 3.5 mL/kg/min X body weight in kg) ÷ 1000]. Using this formula kcal/day or kcal/wk was calculated as intended for MET-min/wk.

Therefore, the exact amount of physical activity expressed in MET-min/wk and energy expenditure expressed in kcal/wk were compared before and during COVID-19 pandemic.

4.12 Data analysis procedure

First the response rate was calculated using the basic formulae; RR = [(No. of survey returned ÷ total no. of potential surveys sent out) × 100]. Data collected through 308 questionnaires was recorded and analyzed using Statistical Packages for Social Sciences (SPSS) version 23. The central tendency and dispersion of continuous variables which mainly included age and weight were expressed in mean with 95% confidence interval (CI) and mean [standard error of the mean (SEM)] in Error Bar. Categorical data were reported in frequencies as percentages and sample size (n). The test applied to compare levels of physical activity and energy expenditure before and after COVID-19 pandemic was Wilcoxon Signed Rank Test. The statistical measures used in this study are descriptive statistics and each question from the questionnaire was analyzed individually with level of significance set up to 0.05 and to minimize type 1 error.

4.13 Ethical concerns

- The questionnaire was distributed after taking approval from supervisor and students' project committee of College of Physiotherapy, Jinnah Postgraduate Medical Centre, Karachi
- Subjects were informed about the research before filling the form
- Consent was taken from all participants for voluntary participation and the use of data for research and publication purpose
- All the personal information of participants were kept confidential

5. Results

Out of 308 Participants, who participated in study (n=260, 84.4%) were females and (n=48, 15.6%) were males. The mean with 95% C.I of age of the survey participants in study was 22 (21.7 to 22.3) years. Most of the participants in study were undergraduate students of physical therapy degree program (n=244, 79.2%) while (n=24, 7.8%) were postgraduate students enrolled in physiotherapy program. (n=18, 5.8%) were physiotherapy academicians and (n=22, 7.1%) were clinical physiotherapists. The mean weight with 95% C.I of the survey participants in study was 55.6 (54.3 to 56.9) Kg respectively.

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

Table 1: Baseline Characteristics of Studied Samples (n=308)

Characteristics		N	%
Gender	**Male**	48	15.6
	Female	260	84.4
Age (Years)	**Mean (95% C.I)**	***22.0***	***(21.7 -22.3)***
Qualification	**Undergraduate Student**	244	79.2
	Postgraduate Student	24	7.8
	Physiotherapy Academician	18	5.8
	Clinical Physiotherapist	22	7.1
Weight (Kg)	**Mean (95% C.I)**	***55.6***	***(54.3 -56.9)***

The levels of Physical activity expressed as MET-min/week before and during COVID-19 pandemic is classified in Table 2 as mean (95% C.I) and as mean (SEM) in Error Bar (including sitting activity in Fig. 1 and without sitting activity in Fig. 2)

There exists statistical significance ($p < 0.01$) before and during Covid-19 pandemic in physical activity and energy expenditure.

Table 2: Physical activity (MET-min/week) before and during COVID-19 pandemic

Physical Activity	Before COVID-19 pandemic (MET-min/week)[a]	During COVID-19 pandemic (MET-min/week)[a]	Mean Percentage (%)	p-value [b]
Vigorous	1512.9 (1372.8-1653)	1105.3 (995.1-1215.4)	-27	<0.01*
Moderate	830.2 (762-898.4)	499.7 (455.9-543.5)	-39.9	<0.01*
Walking	661.8 (606.6-717)	531.7 (493-570.4)	-19.7	<0.01*
Sitting	281.9 (268.6-295.3)	383.8 (353-414.6)	+36.2	<0.01*
Total	3005 (2771.8-3238.2)	2136.8 (1993.9-2279.6)	-28.9	<0.01*
Total WoS	3287 (3053.4-3520.6)	2520.7 (2364.1-2677.3)	-23.4	<0.01*

Note:

Abbreviation: WoS – Without sitting
a - Expressed in Mean (95% Confidence Interval).
b - Wilcoxon Signed Rank test.

Results show a significant decrease in each category of physical activity (MET-min/week) during COVID-19 pandemic as compared to before COVID-19 with a P-value of <0.01.

Fig. 1. Physical activity (MET-min/week) before and during COVID-19 pandemic expressed in mean and standard error of the mean

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

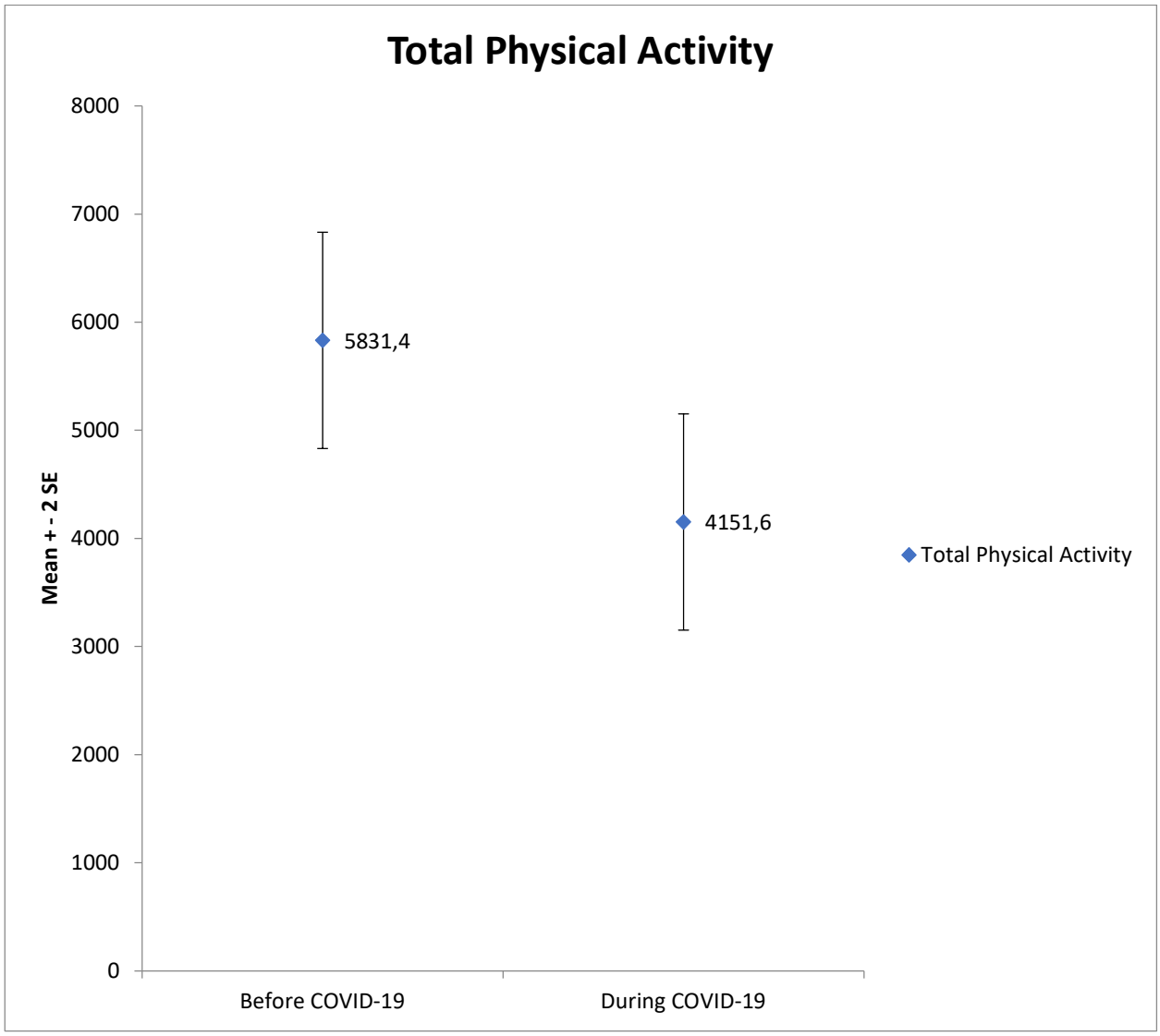
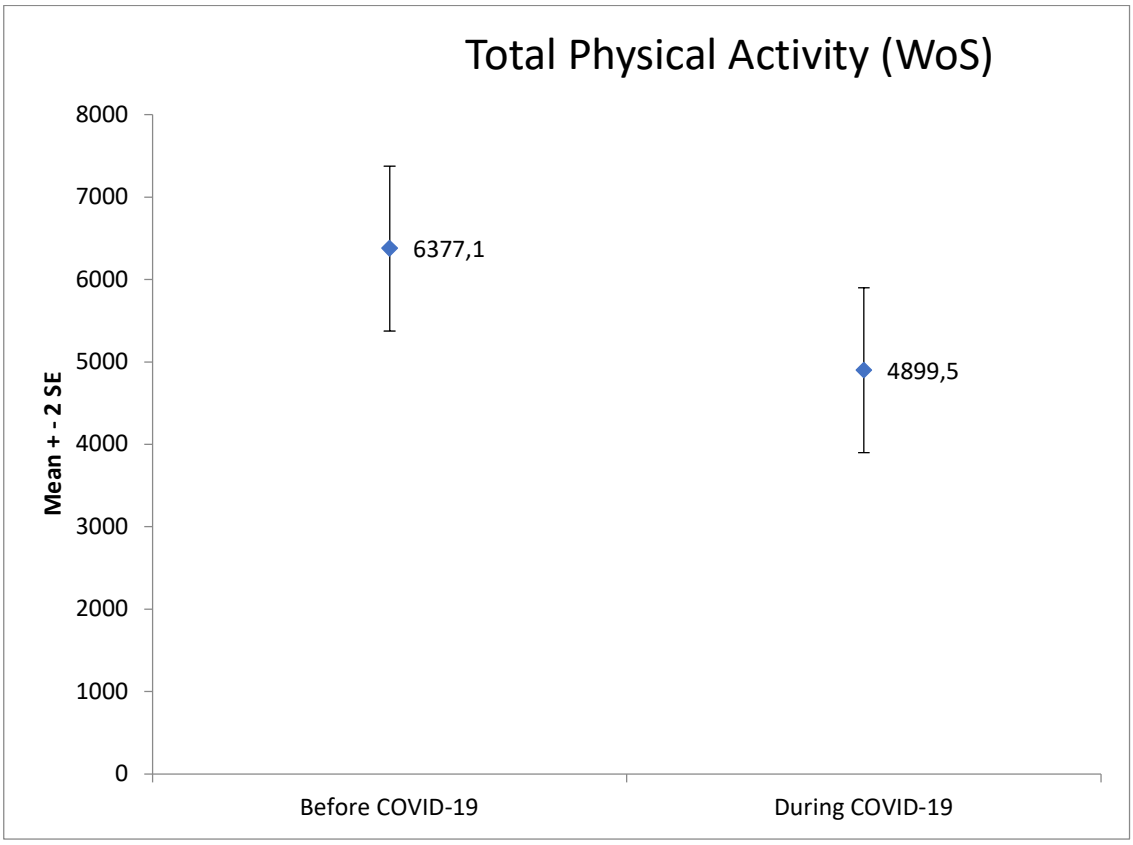


Fig. 2. Physical activity (MET-min/week) before and during COVID-19 pandemic (Without Sitting Activity) expressed in mean and standard error of the mean

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno



While energy expenditure (kcal/week) before and during Covid-19 pandemic period is classified in Table 3 and as mean (SEM) in Error Bar (including sitting activity in Fig. 3 and without sitting activity in Fig. 4).

Table 3: Energy Expenditure Before and During COVID-19 pandemic:

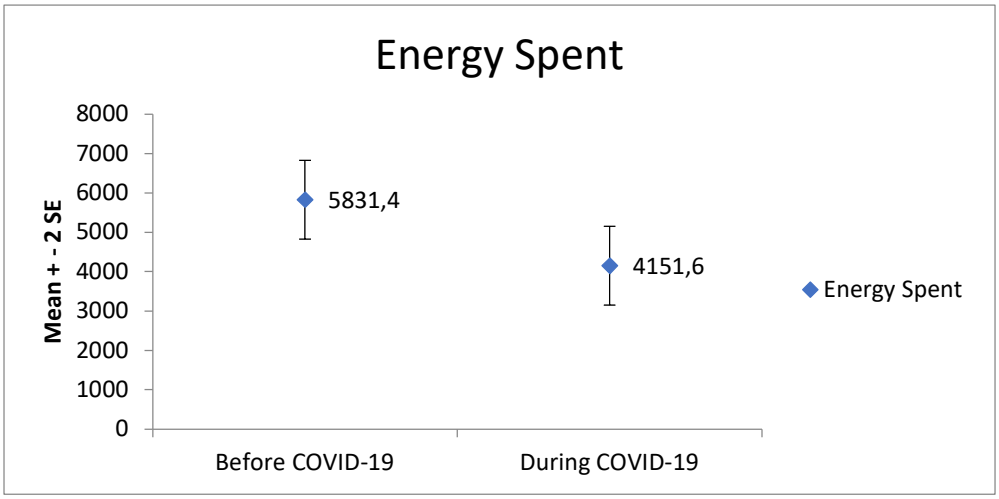
European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

Energy	Before COVID-19 pandemic (kcal/wk)[a]	During COVID-19 pandemic (kcal/wk)[a]	Mean Percentage (%)	p-value [b]
Vigorous	2935.8 (2651.7-3219.9)	2120.2 (1909.1-2331.3)	-27.8	<0.01*
Moderate	1613.3 (1473-1753.6)	994.1 (897-1091.2)	-38.4	<0.01*
Walking	1282.2 (1170.2-1394.1)	1037.3 (957.4-1117.1)	-19.1	<0.01*
Sitting	545.7 (517.5-573.8)	747.8 (683.8-811.8)	+37.1	<0.01*
Total	5831.4 (5349.8-6313)	4151.6 (3865-4438.2)	-28.9	<0.01*
Total WoS	6377.1 (5891.9-6862.3)	4899.5 (4582.2-5216.7)	-23.2	<0.01*

Note:

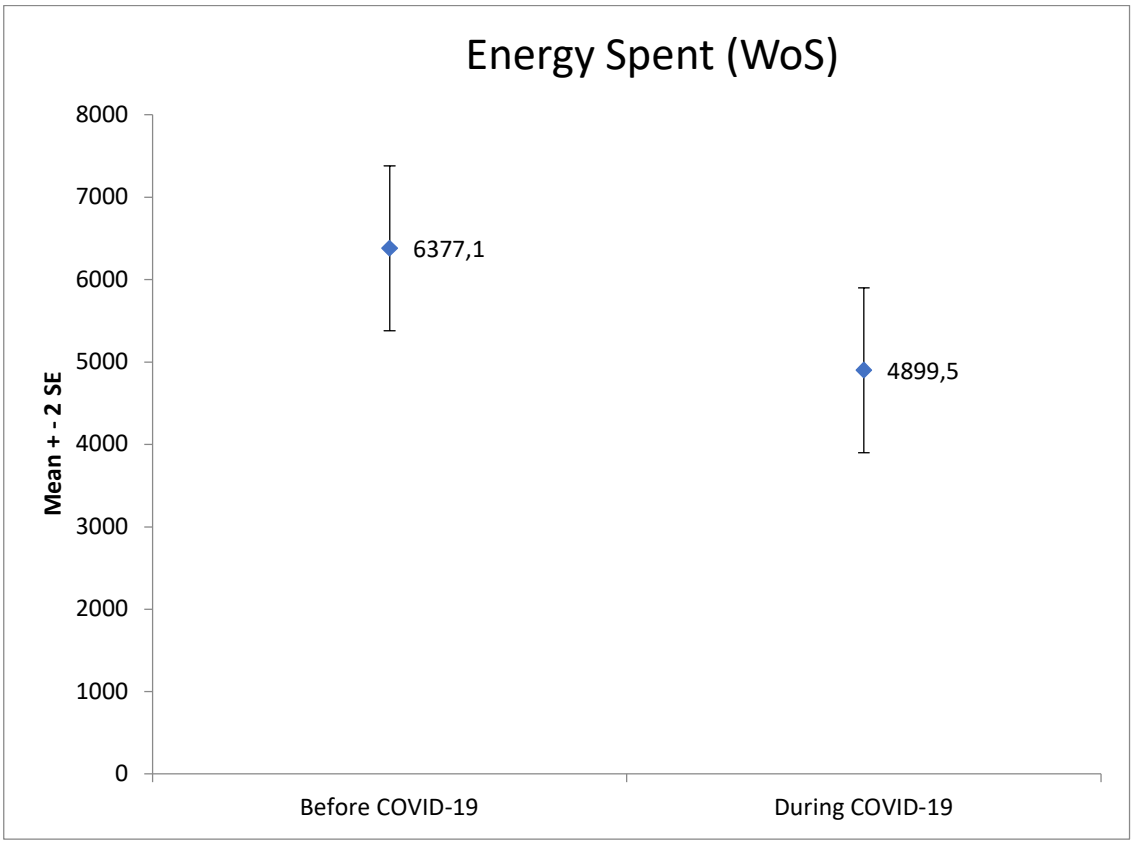
Abbreviation: WoS – Without sitting
a - Expressed in Mean (95% Confidence Interval).
b - Wilcoxon Signed Rank test.

Fig. 3. Energy Expenditure before and during COVID-19 pandemic expressed in mean and standard error of the mean



European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

Fig. 4. Energy Expenditure before and during COVID-19 pandemic (Without Sitting Activity) expressed in mean and standard error of the mean



Again, results show a considerable decrease in energy expenditure among participants during COVID-19 pandemic as compared to before Covid-19 with p-value of <0.01.

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

6. Discussion

The aim of this study was to find out the impact of COVID-19 pandemic on physical activity and energy expenditure among physiotherapy professionals and students. A total of 308 physiotherapy professionals and students participated in the study. Non-probability convenience sampling was used for the study. Required data was conducted through a survey (IPAQ-SF) and questionnaire was administered through online Google forms and filled physically by half of the participants. These methods were used to collect data in a short period of time. The survey took only 10 minutes to complete. The data was analyzed to compare the results of physical activity and energy expenditure before and during COVID-19 pandemic. IPAQ-SF is a modified survey and it classifies physical activity in four categories; Vigorous, moderate, sitting and walking. The study proved an alternate hypothesis as there is a significant difference ($p < 0.01$) in physical activity and energy expenditure among physiotherapy professionals and students during the COVID-19 pandemic as compared to before COVID-19 pandemic.

Considering the study findings, it reported that physiotherapy professionals and students performed more physical activity before the COVID-19 Pandemic (1512.9 MET-min/wk) and vigorous activity decreased (-27.0%) as compare to during the pandemic (1105.3 MET-min/wk). Moderate physical activity is also reduced by (-39.9%) during pandemic (499.7 MET-min/wk), as compared to before pandemic period (830.2 MET-min/wk). Walking was also affected (-19.7%) during the pandemic period (531.7 MET-min/wk), as compared to the walking before pandemic (661.8 MET-min/wk). The sitting activity was also affected and increased (+36.2%) during pandemic (383.8 MET-min/wk) as compared to the sitting activity before pandemic (281.9 MET-min/wk). Overall, physical activity was higher before COVID-19 pandemic (3005 MET-min/wk) and decreased (−28.9%), compared to the physical activity during pandemic (2136.8 MET-min/wk) with significance difference of ($p<0.01$). Without considering sitting component, the physical activity was decreased (-23.2%) during the pandemic (2520.7 MET-min/wk) as compared to the before pandemic (3287 MET-min/wk). Statistically significant differences were noted in individual component of physical activity (Vigorous, moderate, walking, and sitting) before and during COVID-19 Pandemic ($p < 0.01$) as shown in Table 2.

Energy expenditure is also decreased before and during the COVID-19 pandemic. Energy expenditure during the lockdown period was (2120.2 kcal/wk), which is almost decreased (−27.8%) as compared to the energy expenditure following vigorous activity before the lockdown period (2935.8 kcal/wk). Energy expenditure followed by moderate physical activity was also decreased (−38.4%) during the pandemic (994.1 kcal/wk) as compared to the before pandemic (1613.3 kcal/wk). Energy expenditure during walking was decreased (−19.1%) during the pandemic (1037.3 kcal/wk) as compared to before pandemic (1282.2 kcal/wk). Energy expenditure during sitting was increased (+37.1%) during pandemic period (747.8 kcal/wk) as compared to before pandemic (545.7 kcal/wk). Overall energy expenditure was decreased (−28.9%) during the COVID-19 pandemic (4151.6 kcal/wk) as compared to before pandemic (5831.4 kcal/wk). Statistically significant difference was noted in the individual components of physical activity (Vigorous, Moderate, Walking, and sitting) before and during lockdown period ($p < 0.01$). Energy expenditure before and during COVID–19 pandemic were 6377.1 (5891.9–6862.3) kcal/wk and 4899.5 (4582.2–5216.7) kcal/wk; $p < 0.01$ were observed without sitting component. There was approximately 23.2% reduction of energy expenditure, as shown in Table 3.

A previous study was conducted to find out the levels of physical activity of university students. Study included 333 participants who were specializing in physical education and physical therapy with an average age of 21 years. Their results were a bit compatible with our study that the analysis of physical activities (Vigorous MET and Total Physical activity MET) were obtained showing significant differences between results and genders. They collected data using IPAQ-SF too. Vigorous MET was found (2867.34 MET-min/wk) in their study. The moderate physical activity calculated was (1111.12 MET-min/wk). Walking MET was found to be 1395.18 MET-min/wk while the overall Physical activity MET calculated was 5343.92 MET-min/wk. Their study found male students more active as compared to female students. Women were reported to be performing less vigorous activity as compared to men.

Physical activity is considered as one of the important factors of our lives. But considering the current scenario, COVID-19 pandemic has put so many restrictions in our lives. Due to the pandemic, people are trying to distance themselves or stay at home to be safe. Office workers are supposed to work from home and physical classes of students are shifted to online. Staying at home has reflected so many drawbacks for people. Many are suffering from bad mental health due to social isolation. Even our study results showed a significant decrease in physical activity and energy expenditure of individuals due to COVID-19 pandemic, so we suppose there could be a chance of reduced immune system since lack of physical activity leads to decreased immune system. Multiple studies supported the findings showing individuals who stay at home or isolate themselves a lot are found to be very less active and report many health risk behaviors. Daily involvement in physical activity has been reported to be reducing the risk of lower respiratory tract disorders and sickness days. Lack of activity is also proven to be affecting your physiological processes including cholesterol levels, high blood pressure, cardiovascular function, obesity and insulin sensitivity. Hence, regular exercise and physical activity is recommended to boost up the immune system. Even one of the studies found that 5 minutes of regular stair running can cause an immediate increase in the number of natural killer cells. Physical activity decreases hyper-insulinaemia, improves insulin resistance and reduces the risk for diabetes and cancers. Many researchers suggested that in women, recurrence risk of cancers might be reduced by engaging more than 4.5 MET hours/week of recreational physical activity including approximately 2–3 h per week of brisk walking. Even moderate endurance exercises enhance the number of immunological indices such as T-cell count and immunoglobulin level and can enhance the immune response.

Implementing surveys online through web-based E-survey and conducting data physically alongside speed up the process of data collection. Considering the strengths of this study, it included a large sample size (n=308) and the method of collecting data was cost effective and less time consuming. The limitation of our study was an unequal distribution of physiotherapy professionals and students. Future studies could focus on other medical professionals and different populations including geriatrics and pediatrics. Also, they could focus on including other outcome measures for measuring physical activity and energy expenditure. This study highlights physical activity and energy expenditure levels among physiotherapy professionals and students before and during the COVID-19 Pandemic.

7. Conclusion

About 23.4% physical activity and 23.2% energy expenditure were decreased among physiotherapy professionals and students during the COVID-19 pandemic when compared with before pandemic results. This study can help physiotherapy professionals and students to reconsider their physical activity and energy expenditure levels and try to improve them. This study can help form the foundation for such studies in the near future in the region.

References

Abid, K., Bari, Y. A., Younas, M., Tahir Javaid, S., & Imran, A. (2020). <? covid19?> Progress of COVID-19 Epidemic in Pakistan. Asia Pacific Journal of Public Health, 32(4), 154-156.

Bowden Davies, K. A., Sprung, V. S., Norman, J. A., Thompson, A., Mitchell, K. L., Halford, J. C., ... & Cuthbertson, D. J. (2018). Short-term decreased physical activity with increased sedentary behaviour causes metabolic derangements and altered body composition: effects in individuals with and without a first-degree relative with type 2 diabetes. Diabetologia, 61(6), 1282-1294.

Brenner, I. K., Shek, P. N., & Shephard, R. J. (1994). Infection in athletes. Sports Medicine, 17(2), 86-107.

Dwyer, M. J., Pasini, M., De Dominicis, S., & Righi, E. (2020). Physical activity: Benefits and challenges during the COVID-19 pandemic. Scandinavian journal of medicine & science in sports, 30(7), 1291.

Edwards, M. K., & Loprinzi, P. D. (2016, August). Effects of a sedentary behavior–inducing randomized controlled intervention on depression and mood profile in active young adults. In Mayo Clinic Proceedings (Vol. 91, No. 8, pp. 984-998). Elsevier.

Giustino, V., Parroco, A. M., Gennaro, A., Musumeci, G., Palma, A., & Battaglia, G. (2020). Physical activity levels and related energy expenditure during COVID-19 quarantine among the Sicilian active population: a cross-sectional online survey study. Sustainability, 12(11), 4356.

Hambrecht, R., Wolf, A., Gielen, S., Linke, A., Hofer, J., Erbs, S., ... & Schuler, G. (2000). Effect of exercise on coronary endothelial function in patients with coronary artery disease. New England Journal of Medicine, 342(7), 454-460.

Eurosurveillance Editorial Team (2020). Note from the editors: World Health Organization declares novel coronavirus (2019-nCoV) sixth public health emergency of international concern. 2020 Feb 6;25(5):200131e.

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., ... & Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA network open, 3(3), e203976-e203976.

Lai, X., Wang, M., Qin, C., Tan, L., Ran, L., Chen, D., ... & Wang, W. (2020). Coronavirus disease 2019 (COVID-2019) infection among health care workers and implications for prevention measures in a tertiary hospital in Wuhan, China. JAMA network open, 3(5), e209666-e209666.

Lee, P. H., Macfarlane, D. J., Lam, T. H., & Stewart, S. M. (2011). Validity of the international physical activity questionnaire short form (IPAQ-SF): A systematic review. International journal of behavioral nutrition and physical activity, 8(1), 1-11.

Marelli, S., Castelnuovo, A., Somma, A., Castronovo, V., Mombelli, S., Bottoni, D., ... & Ferini-Strambi, L. (2021). Impact of COVID-19 lockdown on sleep quality in university students and administration staff. Journal of neurology, 268(1), 8-15.

Maugeri, G., Castrogiovanni, P., Battaglia, G., Pippi, R., D'Agata, V., Palma, A., ... & Musumeci, G. (2020). The impact of physical activity on psychological health during Covid-19 pandemic in Italy. Heliyon, 6(6), e04315.

Moraska, A., & Fleshner, M. (2001). Voluntary physical activity prevents stress-induced behavioral depression and anti-KLH antibody suppression. American Journal of Physiology-Regulatory, Integrative and Comparative Physiology, 281(2), R484-R489.

Owen, N., Sparling, P. B., Healy, G. N., Dunstan, D. W., & Matthews, C. E. (2010, December). Sedentary behavior: emerging evidence for a new health risk. In Mayo Clinic Proceedings (Vol. 85, No. 12, pp. 1138-1141). Elsevier.

Ayers, S., Baum, A., McManus, C., Newman, S., Wallston, K., Weinman, J., & West, R. (Eds.). (2007). Cambridge handbook of psychology, health and medicine. Cambridge University Press.

Pulla, P. (2020). Covid-19: India imposes lockdown for 21 days and cases rise. BMJ (Clinical research ed.), 368, m1251.

Romeo, J., Wärnberg, J., Pozo, T., & Marcos, A. (2010). Physical activity, immunity and infection. Proceedings of the Nutrition Society, 69(3), 390-399.

Saunders, D. H., Greig, C. A., & Mead, G. E. (2014). Physical activity and exercise after stroke: review of multiple meaningful benefits. Stroke, 45(12), 3742-3747.

Srivastav, A. K., Sharma, N., & Samuel, A. J. (2021). Impact of Coronavirus disease-19 (COVID-19) lockdown on physical activity and energy expenditure among physiotherapy professionals and students using web-based open E-survey sent through WhatsApp, Facebook and Instagram messengers. Clinical Epidemiology and Global Health, 9, 78-84.

Thune, I. N. G. E. R., & Furberg, A. S. (2001). Physical activity and cancer risk: dose-response and cancer, all sites and site-specific. Medicine and science in sports and exercise, 33(6 Suppl), S530-50.

Timmons, B. W., & Cieslak, T. (2008). Human natural killer cell subsets and acute exercise: a brief review. Exerc Immunol Rev, 14(905), 8-23.

Velavan, T. P., & Meyer, C. G. (2020). The COVID-19 epidemic. Tropical medicine & international health, 25(3), 278.

Wang, C., Horby, P. W., Hayden, F. G., & Gao, G. F. (2020). A novel coronavirus outbreak of global health concern. The lancet, 395(10223), 470-473.

Waris, A., Atta, U. K., Ali, M., Asmat, A., & Baset, A. J. N. M. (2020). COVID-19 outbreak: current scenario of Pakistan. New Microbes and New Infections, 35, 100681.

Zachary, Z., Brianna, F., Brianna, L., Garrett, P., Jade, W., Alyssa, D., & Mikayla, K. (2020). Self-quarantine and weight gain related risk factors during the COVID-19 pandemic. Obesity research & clinical practice, 14(3), 210-216.

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

ANNEXURE

INFORMED CONSENT FORM

I have fully explained the procedure and rationale of my study. I have asked whether any questions have arisen regarding the procedure and answered any questions to the best of my ability.

RESEARCHER'S NAME: RABEL SUNDRO

RESEARCHER'S SIGNATURE: _____

I have been fully informed as to the procedure to be followed. In signing this consent form I agree to participate in the study. I understand that I am free to refuse to participate or withdraw my consent and discontinue my participation in this study at any time. I also understand that if I have any queries the researcher will help me to understand.

SUBJECT'S NAME: _____

SUBJECT'S SIGNATURE: _____

DATE: _____

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

QUESTIONNAIRE

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE - SHORT FORM

PART-1: Demographics

Name: _____ Age: _____

Gender: _____ Weight: _____

Qualification: _____

Institute/ Workplace: _____

Email Address: _____

Contact no: _____

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

PART-2: LEVELS OF PHYSICAL ACTIVITY BEFORE COVID-19

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active before and during COVID-19 pandemic. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous activities that you did before COVID-19. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1. Before COVID-19 pandemic, on how many days did you do vigorous physical

activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

No vigorous physical activities ---------->Skip to question 3

2. How much time did you usually spend doing vigorous physical activities on one of those days?

_____ hours per day

_____ minutes per day

_____Don’t know/Not sure

Think about all the moderate activities that you did before COVID-19 pandemic. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. Before COVID-19 pandemic, on how many days did you do moderate physical

activities like carrying light loads, bicycling at a regular pace, or doubles tennis?

(Do not include walking).

_____ days per week

No moderate physical activities ----------> Skip to question 5

4. How much time did you usually spend doing moderate physical activities on one of those days?

_____ hours per day

_____ minutes per day

_____Don't know/Not sure

Think about the time you spent walking before COVID-19. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. Before COVID-19 pandemic, on how many days did you walk for at least 10 minutes at a time?

_____ days per week

No walking ----------> Skip to question 7

6. How much time did you usually spend walking on one of those days?

_____ hours per day

_____ minutes per day

_____ Don't know/Not sure

Think about the time you spent sitting on weekdays before COVID-19 pandemic. Include time spent at work, at home, while doing course work and during leisure time. This may

include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. Before COVID-19 pandemic, how much time did you spend sitting on a weekday?

_____ hours per day

_____ minutes per day

_____Don't know/Not sure

PART-3: LEVELS OF PHYSICAL ACTIVITY DURING COVID-19 PANDEMIC

8. During COVID-19 pandemic, on how many days do you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

No vigorous physical activities ---------->Skip to question 10

9. How much time do you usually spend doing vigorous physical activities on one of those days?

_____ hours per day

_____ minutes per day

_____Don't know/Not sure

10. During COVID-19 pandemic, on how many days do you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? (Do not include walking).

_____ days per week

No moderate physical activities ----------> Skip to question 12

11. How much time do you usually spend doing moderate physical activities on one of those days?

_____ hours per day

_____ minutes per day

_____Don’t know/Not sure

12. During COVID-19 pandemic, on how many days do you walk for at least 10 minutes at a time?

_____ days per week

No walking ----------> Skip to question 14

13. How much time do you usually spend walking on one of those days?

_____ hours per day

_____ minutes per day

_____ Don’t know/Not sure

14. During COVID-19 Pandemic, how much time do you spend sitting on a weekday?

_____ hours per day

_____ minutes per day

_____Don’t know/Not sure

Thank you so much for participation!

Acknowledgement

During the whole process many people have been kind, helpful and encouraging towards us; our parents, principal, supervisor, colleagues and friends. We are very thankful to them for their support. We would especially like to thank our supervisor, Dr. Malik Sheraz for his unconditional support, help, motivation and imparting of knowledge. We would like to dedicate this research to our parents and supervisor who have been very supportive throughout the process and have been a pillar of strength for us.

Research report entitled ‘‘Impact of COVID-19 pandemic on physical activity and energy expenditure among physiotherapy professionals and students” submitted by RABEL SUNDRO from batch 2016 College of Physiotherapy, Jinnah Postgraduate Medical Centre (JPMC) for the partial fulfillment and requirement for the Degree of Doctor of Physiotherapy (DPT) from correspondence JPMC is original and authentic work done under guidance of Dr. Malik Sheraz.

European journal of volunteering and community-based projects Vol.1, No 2; 2022
ISSN: 2724-0592 E-ISSN: 2724-1947
Published by Odv Casa Arcobaleno

Role of antibiotics on the condition of environmental and Human health factors, A review

Muhammad Mazhar Fareed

Government College University Faisalabad, e-mail: mmazharfareed22@gcuf.edu.pk

Abstract: The anti-infection or antibiotics build-ups in the natural way of life are a developing general wellbeing worry due to their inclusion in the advancement of antimicrobial opposition, mutagenicity, cancer-causing nature, excessive touchiness, bone marrow concealment, and disturbance of gut microbiota. The unpredictable utilization of anti-infection agents for the treatment of sicknesses and further developed creature creation brings about the statement of these build-ups in milk, eggs, and meat in spite of the fact that their utilization isn't featured for the food varieties devoured by human creatures. Additionally, the anti-microbials burned-through in the clinical settings and creature creation are discharged into the climate at an enormous scope which may antagonistically upset the earthbound and amphibian biological systems. The matter can turn out to be more ground-breaking soon in light of the fact that the creation of food creatures at a mechanical scale will altogether expand the utilization of antimicrobials. The issue brought about by these anti-infection build-ups in the evolved way of life is two-overlay; the immediate harmfulness to people and the chance of the rise of safe bacterial strains eventually prompting the disappointment of anti-microbial treatment. Present article fundamentally examinations the factors adding to the presence of anti-infection build-ups in the natural way of life and their suggestions and hazardous effect on purchasers and proposes the potential approaches to lessen the antimicrobial deposits in the food.

Key words: Antibiotics, human health, biological system, ecosystem

Doi: 10.5281/zenodo.6849861

1.Introduction

Regular, engineered, too as semisynthetic medications which can kill or restrain the development of microorganisms, can be named anti-toxins. Anti-toxins are the best gathering of medications to treat bacterial diseases in the two people just as in creatures by acting explicitly on their objectives (Aarestrup et al., 1998). Following the revelation of penicillin in 1928, a large number of anti-infection agents were created for creatures, plants, and human

use. At first, these anti-toxins were utilized in clinical and veterinary settings just for the remedial administration of specific diseases; later, the medications were additionally utilized as development advertisers particularly in domesticated animals and poultry businesses. Anti-microbial use was denied in Europe in 2006, in any case, their utilization in animals, poultry, and horticulture areas is as yet normal in many regions of the planet. It is assessed that the worldwide utilization of anti-microbials was around 63,151 tons in 2010 for food creatures and hydroponics (Akici, Aydin, & Kiroglu, 2018; Alaboudi, Basha, & Musallam, 2013). Also, it is expected that the sum will further increment by 67% until 2030 with the most noteworthy utilization in India, Brazil, Russia, and South Africa. This nonsensical utilization of anti-microbials in horticulture, people, and creatures brought about the aggregation of anti-microbials deposits in the regular biological system and climate that can act hurtful impacts such like the advancement of antimicrobial obstruction. Numerous other general wellbeing concerns have been brought up as to the anti-toxin deposits in the evolved way of life and climate. For instance, the ingestion of anti-toxin deposits could adjust the human microbiota and advance obstruction among the human ordinary bacterial vegetation (Alaboudi et al., 2013; Andersson & Hughes, 2011). Also, the inappropriate utilization of anti-infection agents prompts their amassing in the tissues of the food creatures as deposits and which eventually become a piece of the natural way of life. Subsequently their utilization is precluded by the wellbeing, just as food administrative specialists. The current review planned to give a thorough perspective on wellbeing hazards related with anti-infection deposits in the natural pecking order and climate remembering the impacts for the rise of anti-toxin safe microscopic organisms and to talk the data hole and give proposals to diminish the anti-microbial build-up in the natural pecking order to stay away from the expected perils to human, creature and natural wellbeing. Here we sum up the considers on the connection between the utilization of antimicrobials for the development advancement in food-delivering creatures and the advancement of opposition in microbes (Ao et al., 2018). Further, we zeroed in on the presence and identification technique for different anti-toxins in food sources of particularly of creature beginning. In addition, the wellsprings of anti-infection agents in food sources from various starting points are summed up. Further, the effect of anti-infection deposits on the buyers is summed up.

2.Source of antimicrobials antimicrobial residual in food

Engineered and semisynthetic antimicrobials are utilized in veterinary and human medication for the treatment and control of sicknesses and can be managed topically, orally, and

parenterally. Moreover, they assume a significant part in advancing the development of food. Antimicrobials can store in tissues of the body as deposits and it requires some investment for deposits to be discharged or processed (Azanu et al., 2016). The measure of these deposits can be higher particularly when these creatures are devoured by the people during their prescription or before long the drug withdrawal. Anti-infection deposits can unfavourably influence human wellbeing by different cycles, for example, harming consequences for the organs, anti-toxin safe qualities, and microorganisms, direct harmfulness to purchasers. Antimicrobial build-ups are utilized restoratively just as prophylactically to advance development and control sicknesses. The endorsed drugs for veterinary use have lawfully endorsed greatest build-ups limits (MRLs) for the parent drugs or their metabolites in the food items from the treated creatures through appraisal of safe focus for shoppers (Azanu et al., 2016; Barton, 2000). The investigations have recommended that anti-infection agents debase a wide range of human food items like vegetables, domesticated animals, oceanic items, and poultry items for example eggs, meat, and milk. Besides, it is viewed as that anti-microbial buildups can gather in sea-going items as these medication deposits have been accounted for from different amphibian conditions. The anti-microbials and anti-toxins buildups being utilized as natural composts in excrement become part of vegetables. Therefore, there are two ways of the wellsprings of anti-toxin buildups in food. Initially, anti-infection agents are utilized for development advancement just as control of illness and to work on the viability of food in people (Bassil, Bashour, Sleiman, & Abou-Jawdeh, 2013). Besides the aggregation of these medication buildups among the food creatures living in a climate debased with anti-infection agents. Anti-infection deposits gather in the blood just as in different tissues, after organization of high convergences of anti-toxins anyway the utilization of non-cured feed in creatures kills these deposits from the blood just as tissues of these creatures. The high convergence of anti-toxins managed to creatures through infusion or on the other hand creature determined feed just as because of capacity, water, and transportation during handling might bring about the defilement of creature beginning food sources (Ben et al., 2019). Besides, excrement can likewise defile food through waste reusing, especially vegetables are polluted as dung are being utilized as a compost. Anti-toxins are broadly utilized in fish cultivating and anti-infection deposits are amassed inside human body frameworks following the utilization of polluted fish that can unfavourably influence human wellbeing (Blaser, 2016). The anti-toxin deposits gather in food items, for model, milk and meat, and a few consumable items albeit the low centralizations of anti-toxin deposits are considered as protected. Interestingly, a few anti-toxins are destructive to human

wellbeing, and their utilization is restricted for instance chloramphenicol. Milk is fundamental as well as gainful food since it is a wellspring of proteins in each time of individuals. Far and wide utilization of anti-infection agents for treatment of mastitis in lactating cows and dry cow treatment leads towards amassing of anti-infection deposits in milk (Chand, Bhavadasan, & Vijaya, 2000).

3.Impact of antibiotics on systematics biological systems and association with bacterial and Eco-toxification

The presence of thin and wide range anti-microbials in various ecological tests has been accounted for in different examinations. The anti-infection agents are discharged by people and creatures which can sully the sewers and afterward to waterways just as oceans. For instance, fluoroquinolone, sulfamethoxazole, and ofloxacin were recognized from seawater of Hailing Island, Belgian harbors, and Laizhou Sound, individually. Moreover, sulfonamides and antibiotic medication were additionally recognized in the release of wastewater treatment plants. A few anti-toxins are recognized in medical clinic squanders, for instance, beta-lactams, macrolides, lincomycin, fluoroquinolones, trimethoprim, sulfamethoxazole, and sulfonamides. It has been accounted for that ofloxacin, trimethoprim, sulfamethoxazole, and ciprofloxacin have been recognized in civil wastewater (Chen et al., 2018). A few anti-toxins are utilized as feed added substances in hydroponics ventures. For instance, sulfonamides, oxytetracycline, erythromycin, florfenicol, and sarafloxacin, are found in water tests. Anti-infection agents and their buildups are as often as possible discharged and debase regular conditions. Various sources add to this pool of anti-toxin buildups, for instance, creature cultivation, dairies, veterinaries, domestics, poultry, release of emergency clinic squander, creature excreta, drug plants, and city squander. A few anti-microbials are utilized in the horticulture business to improve fish cultivating, animals development, and beekeeping (Damman, Miller, Surawicz, & Zisman, 2012). The anti-microbials and their metabolites are released especially from the defecation of the poultry creatures and pollute the indigenous habitat. These buildups and the metabolites dirty water and soil in a roundabout way, for instance, a polyether anti-infection i.e., the Monensin anti-infection used to advance the development of animals in the dairy ranches was found to spread to the regular assets. Albeit, the utilization of anti-toxins is exceptionally low in plants than creatures the buildups were found in water utilized in rural land bringing about the pollution of the rural field. Barely any anti-microbials have low sub-atomic weight like sulfonamides, aminoglycosides, nitrofurans, quinolones, macrolides, rifamycins, amphenicols, beta-lactams, antibiotic medications, phosphonates, and

lincosamides, in this way they break down promptly in water bodies which brings about longer determination of anti-toxins (Davies & Davies, 2010). Anti-infection agents that are utilized in domesticated animals can likewise defile the fields by compost and these anti-infection deposits are caught up in the dirt and come to the groundwater. The anti-toxin buildups are blended in with freshwater through soil disintegration and downpour. Anti-microbials follow up on both objective creatures (microorganisms) just as on non-target organic entities, for instance on zooplankton, freshwater green growth, and fish. The unfavourable impacts of monensin on species extravagance have been accounted for. Besides, fluoroquinolones are hurtful to prokaryotes when contrasted with eukaryotes that are usually present in medical clinic effluents and the drawn-out utilization of fluoroquinolone has shown hurtful consequences for human wellbeing just as high genotoxicity (Dewdney et al., 1991). Anti-toxins influence straightforwardly and in a roundabout way the bacterial populaces as their over-the-top use might prompt the advancement of obstruction. The presence of anti-toxin buildups in effluents results in pollution of seawater in the USA, Greece, China, Italy, Germany, Turkey, and Belgium. In light of natural, physical, and compound properties anti-infection agents are effect on living beings. The anti-toxin, especially those being utilized in the poultry and veterinary industry, expands the shot at endurance of microorganisms under anti-infection stress because of determination pressure which brings about the advancement of multi-drug safe (MDR) strains. These MDR strains are broadly revealed in the dirt and oceanic milieus (Esiobu, Armenta, & Ike, 2002; Ferri, Ranucci, Romagnoli, & Giaccone, 2017).

4.Impact of antibiotics in food system

Anti-infection/antibiotics agents are broadly utilized in creatures for some, benefits covering corpse quality, advancement of development, creature wellbeing, and financially savvy creation. Anti-toxins are the commonest medicates and are broadly being utilized in creatures as prophylactic and restorative specialists for the administration of irresistible sicknesses (Ronquillo & Hernandez, 2017). These anti-microbials have assumed a significant part in the anticipation and fix of certain significant contaminations brought about by Escherichia coli, Campylobacter hatchling, Enterococcus, Leptospira, Streptococcus, and Salmonella. Anti-toxins upgrade development rate by changing the motility of the gut, by diminishing the mucous layers in the gut, by diminishing waste supplements, invulnerable framework action, and development of poisons, and by giving good conditions to useful digestive microorganisms to annihilate destructive microbes (Grunwald & Petz, 2003). The body weight of creatures increments up to 4–5% that get anti-infection agents contrasted with those which are filled

without a trace of these medications. In veterinary medication, a few gatherings of anti-toxins are utilized for these reasons, for instance, lincosamide, aminoglycosides, ansamycins, and glycopeptides, β-lactams for example cephalosporin and penicillin, trimethoprim, Sulfonamides, quinolones, nitrofurans, antibiotic medications (Han et al., 2015). Barely any medications or and their blends are utilized as prophylaxis for diverse plant illnesses for instance streptomycin-oxytetracycline is utilized to control radiance scourge sickness in beans and barely any other bacterial illnesses in tomatoes, potatoes, cherries, tobacco, and peppers. The investigations have additionally revealed the take-up of anti-toxins by the vegetables like corn, radish, carrot, and cabbage which were watered with the debased water. Anti-infection agents buildups produce numerous poisonous outcomes; nonetheless, the most widely recognized sign of different medications is hypersensitive responses (Jia et al., 2016). These extreme touchiness responses are seen on account of antibiotic medications, penicillin, and aminoglycosides. The impacts brought about by the drawn-out utilization of anti-microbials on human wellbeing are still obscure. Moreover, it is seen that β-lactams have not many harmful impacts on human wellbeing, these are for the most part associated with inspiring hypersensitive responses. For example, it has been accounted for that antibiotic medication causes a few particular responses like hypersensitivity, phototoxic dermatitis, and skin rashes. Among the people touchy to the penicillins bunch, the deposits of penicillin in milk came about in hypersensitive responses. Another medication streptomycin has huge incidental effects, for instance, it influences vestibular components in the internal ear which causes the deficiency of equilibrium, neurotoxic consequences for babies, fever, and skin rashes (Katz & Brady, 2000). The unfavourably susceptible reaction to the macrolide's metabolites altered by the hepatic cells can cause liver injury. Buildups of chloramphenicol in food sources can cause deadly blood dyscrasia in people. Cancer-causing buildups tie covalently to a few intracellular parts, for instance, glycogen, glutathione, DNA, RNA and proteins, what's more, phospholipids, and show inert dangers. It has been accounted for that Chloramphenicol buildups present in food causes malignant growth.

5.Teratogenic effect

Any compound specialist or medication that creates an unsafe outcome on a hatchling or incipient organism during growth is named a teratogen. Thus, inherent issues that impact utilitarian, just as primary respectability, happen. For instance, when benzimidazole and anthelmintic are managed at a beginning phase of pregnancy they produce harmful results on the incipient organism, moreover, the medication of oxfendazole for example benzimidazole

has a mutagenic impact. Enrofloxacin; a fluoroquinolone anti-infection that restrains the microorganisms by focusing on the DNA gyrase has demonstrated to be teratogenic for the undeveloped organisms of hares and rodents (Obayiuwana, Ogunjobi, Yang, & Ibekwe, 2018).

6.Management of antimicrobial system in food

According to the World Health organization (WHO), The suggestions by different worldwide associations have demanded the savvier utilization of antimicrobial specialists in clinical, veterinary, and farming to ensure public wellbeing. the public specialists for agribusiness, veterinary, drugs, and different partners should concentration to dismiss the utilization of antimicrobial specialists as development advertisers (Organization, 2001). Besides, the anti-microbials thought to be regulated among the food creatures just when the utilization is supported and recommended by the veterinarian particularly the third and fourth era cephalosporins what's more, fluoroquinolones. Creature wellbeing should be improved to diminish the necessity of anti-toxins in food creatures through biosafety and biosecurity measures and illness avoidance by successful inoculation, utilization of probiotics, and great cleanliness rehearses (Nisha, 2008). The utilization of anti-microbials should be for remedial purposes instead of development advancement dependent on bacterial societies and anti-toxin powerlessness testing and clinical experience. The best option ought to be narrow-spectrum anti-microbials while picking antimicrobial specialists. Further, the veterinarian proficient bodies ought to set up rules on a public level for the appropriate use of anti-microbials among various food creatures, by demonstrating the main, second, and last decisions for the administration of bacterial contaminations. In addition, the financial impetuses preferring the unfit remedy of antimicrobial specialists ought to be abrogated. A compelling observation framework for anti-infection obstruction among commensal and zoonotic microbes, just as the microscopic organisms acquired from various food varieties and food creature repositories, is fundamental to comprehend the rise of anti-toxin opposition and give the information for hazard evaluation and execution of designated mediations. The far reaching observation framework incorporates the assortment of information followed by investigation, what's more, answering to screen the fleeting patterns for the utilization of anti-microbials in individuals and food creatures and to screen anti-toxin obstruction among the microorganisms detached from people, veterinary and food varieties (Ferri et al., 2017).

7.Concluding Remarks:

Albeit the particular guidelines are restricted because of the absence of agreement on the more secure centralizations of anti-microbial deposits in the climate concerning the advancement of opposition, The WHO underlines the arrangements for the improvement of drug squander the executives and to limit the anti-infection deposits in the climate. Notwithstanding the new meds in the USA and Europe need ecological danger evaluations by thinking about the environmental effects of medications, the meds currently accessible on the lookout have not gone through these valuations. These appraisals don't address the capability of the medication in obstruction suggestions, rather accentuate the environmental poisonousness. The broad utilization of anti-microbials in creature feed for development advancement represents a critical danger to general wellbeing because of its effect on the advancement of multidrug-safe bacterial strains. The tough control should be adjusted to stay away from the unnecessary utilization of these specialists joined by the improvement of elective measures to shield human wellbeing and to keep the accessible anti-microbials compelling for future clinical ramifications. The consistent observation of antimicrobial opposition in the human, zoonotic and natural microscopic organisms are a precondition to understanding this marvel that can give hazard appraisal information to the assessment and execution of designated mediations. Mindfulness and correspondence at public and worldwide levels are essential for the level-headed utilization of antimicrobials in the evolved ways of life. These important objective crowds should be recognized including the chiefs, horticulture, wellbeing and veterinary experts, media, and people in general, and ought to be educated with evidenced-based data for their direction, choices, and decisions. The information holes still exist in the exact comprehension of anti-infection opposition and its suggestions in food wellbeing. The investigations should zero in on the quantitative examination of the illness trouble caused by safe microscopic organisms. These investigations will additionally add to evaluating the size of the issue and will aid the danger appraisal the planning savvy conventions to balance this threat.

References:

Aarestrup, F. M., Bager, F., JENSEN, N. E., MADSEN, M., MEYLING, A., & Wegener, H. C. (1998). Surveillance of antimicrobial resistance in bacteria isolated from food animals to antimicrobial growth promoters and related therapeutic agents in Denmark. *Apmis, 106*(1-6), 606-622.

Akici, A., Aydin, V., & Kiroglu, A. (2018). Assessment of the association between drug disposal practices and drug use and storage behaviors. *Saudi Pharmaceutical Journal, 26*(1), 7-13.

Alaboudi, A., Basha, E. A., & Musallam, I. (2013). Chlortetracycline and sulfanilamide residues in table eggs: Prevalence, distribution between yolk and white and effect of refrigeration and heat treatment. *Food control, 33*(1), 281-286.

Andersson, D. I., & Hughes, D. (2011). Persistence of antibiotic resistance in bacterial populations. *FEMS microbiology reviews, 35*(5), 901-911.

Ao, X., Liu, W., Sun, W., Cai, M., Ye, Z., Yang, C., . . . Li, C. (2018). Medium pressure UV-activated peroxymonosulfate for ciprofloxacin degradation: Kinetics, mechanism, and genotoxicity. *Chemical Engineering Journal, 345*, 87-97.

Azanu, D., Mortey, C., Darko, G., Weisser, J. J., Styrishave, B., & Abaidoo, R. C. (2016). Uptake of antibiotics from irrigation water by plants. *Chemosphere, 157*, 107-114.

Barton, M. D. (2000). Antibiotic use in animal feed and its impact on human healt. *Nutrition research reviews, 13*(2), 279-299.

Bassil, R. J., Bashour, I. I., Sleiman, F. T., & Abou-Jawdeh, Y. A. (2013). Antibiotic uptake by plants from manure-amended soils. *Journal of Environmental Science and Health, Part B, 48*(7), 570-574.

Ben, Y., Fu, C., Hu, M., Liu, L., Wong, M. H., & Zheng, C. (2019). Human health risk assessment of antibiotic resistance associated with antibiotic residues in the environment: A review. *Environmental research, 169*, 483-493.

Blaser, M. J. (2016). Antibiotic use and its consequences for the normal microbiome. *Science, 352*(6285), 544-545.

Chand, R., Bhavadasan, M., & Vijaya, G. (2000). Antibiotic residues in milk. *Indian Journal of Dairy and Biosciences, 11*, 151-154.

Chen, H., Liu, S., Xu, X.-R., Diao, Z.-H., Sun, K.-F., Hao, Q.-W., . . . Ying, G.-G. (2018). Tissue distribution, bioaccumulation characteristics and health risk of antibiotics in cultured fish from a typical aquaculture area. *Journal of hazardous materials, 343*, 140-148.

Damman, C. J., Miller, S. I., Surawicz, C. M., & Zisman, T. L. (2012). The microbiome and inflammatory bowel disease: is there a therapeutic role for fecal microbiota transplantation? *Official journal of the American College of Gastroenterology| ACG, 107*(10), 1452-1459.

Davies, J., & Davies, D. (2010). Origins and evolution of antibiotic resistance. *Microbiology and molecular biology reviews, 74*(3), 417-433.

Dewdney, J., Maes, L., Raynaud, J., Blanc, F., Scheid, J., Jackson, T., . . . Verschueren, C. (1991). Risk assessment of antibiotic residues of β-lactams and macrolides in food products with regard to their immuno-allergic potential. *Food and Chemical Toxicology, 29*(7), 477-483.

Esiobu, N., Armenta, L., & Ike, J. (2002). Antibiotic resistance in soil and water environments. *International Journal of Environmental Health Research, 12*(2), 133-144.

Ferri, M., Ranucci, E., Romagnoli, P., & Giaccone, V. (2017). Antimicrobial resistance: a global emerging threat to public health systems. *Critical reviews in food science and nutrition, 57*(13), 2857-2876.

Grunwald, L., & Petz, M. (2003). Food processing effects on residues: penicillins in milk and yoghurt. *Analytica Chimica Acta, 483*(1-2), 73-79.

Han, R., Zheng, N., Yu, Z., Wang, J., Xu, X., Qu, X., . . . Wang, J. (2015). Simultaneous determination of 38 veterinary antibiotic residues in raw milk by UPLC–MS/MS. *Food chemistry, 181*, 119-126.

Jia, R., Ma, Q., Fan, Y., Ji, C., Zhang, J., Liu, T., & Zhao, L. (2016). The toxic effects of combined aflatoxins and zearalenone in naturally contaminated diets on laying performance, egg quality and mycotoxins residues in eggs of layers and the protective effect of Bacillus subtilis biodegradation product. *Food and Chemical Toxicology, 90*, 142-150.

Katz, S. E., & Brady, M. S. (2000). Antibiotic residues in food and their significance. *Food Biotechnology, 14*(3), 147-171.

Nisha, A. (2008). Antibiotic residues-a global health hazard. *Veterinary world, 1*(12), 375.

Obayiuwana, A., Ogunjobi, A., Yang, M., & Ibekwe, M. (2018). Characterization of bacterial communities and their antibiotic resistance profiles in wastewaters obtained from pharmaceutical facilities in Lagos and Ogun States, Nigeria. *International journal of environmental research and public health, 15*(7), 1365.

Organization, W. H. (2001). *WHO global strategy for containment of antimicrobial resistance*. Retrieved from

Ronquillo, M. G., & Hernandez, J. C. A. (2017). Antibiotic and synthetic growth promoters in animal diets: review of impact and analytical methods. *Food control, 72*, 255-267.

With the patronage of:

quarterly publication

ISSN: 2724-0592 E-ISSN: 2724-1947

https://pkp.odvcasarcobaleno.it/index.php/ejvcbp/

Published by Casa Arcobaleno Odv

Attività di organizzazioni per la tutela dei cittadini

Iscritta sez. Provincia di Torino Registro regionale delle Organizzazioni di Volontariato determina 150-34064 del 06/10/2014

C.F. 94570230014

Sede legale: Via Gianbattista Cacherano 14 I – Bricherasio To

Sede operativa: Casa Arcobaleno Via Lanino 3/A I – 10100 Torino To