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Research Article

## Knowledge and perceptions about Cannabidiol use

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### Abstract

**Background:** Cannabidiol (CBD) is one of the main cannabinoids present in the cannabis plant. The demand for CBD grew over time with more individuals consuming CBD products due to its potential therapeutic properties. **Objectives:** To assess the knowledge and perceptions of Maltese members of the public and health care professionals (HCPs) about CBD, one of the main cannabinoids present in the cannabis plant. **Methods:** Surveys aiming to assess the knowledge and perception of the public and HCPs about CBD were developed, validated and disseminated. **Results:** Four hundred members of the public and 150 HCPs completed questionnaires. Ninety-six percent of participants (n=384) agreed that CBD has a therapeutic effect. Respondents from the general public were mostly knowledgeable about CBD and its use, had positive perceptions in relation to CBD and like HCPs, feel more comfortable if CBD is recommended by HCPs. HCPs were not so knowledgeable about certain aspects on CBD. One hundred and twelve HCPs were not aware that there is only one FDA/EMA approved CBD-based product. HCPs would feel comfortable in prescribing CBD products for pain and insomnia and the majority of them (55%; n=83) believe that CBD has mostly an analgesic effect. Social stigma associated with the use of CBD and potential judgement of HCPs were barriers to CBD use. **Conclusion:** Increased research, knowledge and availability of prescribing information and guidelines related CBD use might lead to an increased willingness of HCPs to recommend CBD and lead to a decrease in potential barriers associated with its use.

**Keywords:** Cannabidiol, positive perceptions, pain and insomnia

## INTRODUCTION

Cannabis is being increasingly researched due to its different therapeutic properties<sup>1</sup>. The cannabis plant contains a large number of cannabinoids which are bioactive molecules and effects of these are primarily mediated by cannabinoid (CB) receptors<sup>2</sup>. The two most researched cannabinoids are tetrahydrocannabinol (THC) and cannabidiol (CBD). Both cannabinoids can be found in the cannabis plant however ratios vary according to species. Other cannabinoids include cannabinal, cannabigerol, cannabivarin and cannabiodiol<sup>3,4</sup>.

THC is known to produce psychoactive effects and increase stress and anxiety whilst CBD, exhibits antipsychotic effects and generally reduces anxiety and stress<sup>5,6</sup>. The demand for CBD grew over time with more individuals consuming CBD products due to its potential therapeutic uses<sup>7</sup>. The anticonvulsant activity of CBD led to the approval of CBD for the treatment of treatment-resistant epilepsy<sup>8-10</sup>.

CBD is reported not to have any psychoactive or psychotropic effects unlike THC<sup>5,6</sup>. Russo (2017) views this as an inaccurate claim since CBD has been reported to produce pharmacological benefits on mental health disorders such as schizophrenia, depression, anxiety and addiction<sup>10,11</sup>.

A study by García-Gutiérrez et al., (2020) reported that CBD does not have sedating properties and Russo (2017) explained that products containing CBD may be sedating but pure CBD does not produce sedation<sup>3,11</sup>. Sedation and somnolence are listed as very common adverse effects which can occur with use

of Epidyolex®/ Epidiolex® which consists of 100mg pure CBD, indicated for treatment-resistant epilepsies<sup>12</sup>.

Different perceptions and levels of knowledge related to CBD use have been reported by patients and healthcare professionals (HCPs). According to Link et al., (2020), pharmacists working in the United States lacked knowledge about over-the-counter (OTC) CBD products and felt unprepared in giving advice to patients about CBD and discussing the use of OTC CBD products with other HCPs. Two major concerns that pharmacists reported were the safety and quality of OTC CBD products<sup>13</sup>. Patient concerns related to CBD reported by Wershoven et al., (2020) included limited scientific data to help guide HCPs, adverse effects of cannabinoids, potential for abuse and potential effects on driving<sup>14</sup>. Leszko and Meenrajan (2021) showed that a common concern of patients was that they might be judged or misunderstood by physicians if they knew that CBD was being used by them. Caregivers suggested that CBD should not be available over the counter but should be regulated by the government and labelled as a medicine<sup>15</sup>. The concern of being judged or misunderstood for using cannabis was reported as a barrier to CBD use<sup>16</sup>. Leszko and Meenrajan (2021) demonstrated the need for awareness about the difference between CBD and Medicinal Cannabis (MC) as the general public often confuse CBD with MC<sup>15</sup>. In a study by Schilling et al., (2021), the majority of participants knew the difference between MC and CBD<sup>17</sup>.

In 2018 the Maltese Drug Dependence Act was amended, allowing HCPs to prescribe and dispense medicinal preparations of cannabis<sup>18</sup>. The attitudes, beliefs and

knowledge on medical cannabis of Maltese students was assessed and respondents considered cannabis to have therapeutic properties but felt that its use could lead to addiction and misuse<sup>19</sup>.

The aim of the study was to assess the knowledge and perceptions of Maltese (i) members of the public (ii) HCPs about CBD.

## METHODS

Study was conducted whilst following guidelines described in the Standards for Reporting Qualitative Research<sup>20</sup>. A survey to assess the knowledge and perception of the public and HCPs about CBD was conducted. Two questionnaires, one for the general public and one for HCPs were developed. The two questionnaires were divided into 4 sections: (i) demographic information (ii) knowledge about CBD (iii) perceptions about CBD (iv) potential barriers related to CBD use.

Questions were presented in close-ended format and as statements. For each statement participants had to select whether they 'strongly disagree', 'disagree', 'neither agree or disagree', 'agree' and 'strongly agree'. Mean rating scores were given for each statement, where a score of 1 was given if the participant 'strongly disagreed' and a score of 5 was given if the participant 'strongly agreed' with the statement provided. Comparative analysis was univariate. The Kruskal Wallis test was used to compare rating scores provided to a statement between groups of participants clustered by demographic variables such as age.

Validation of the questionnaires was carried out through discussion with a panel consisting of: three pharmacists, one general practitioner, one physiotherapist and two lay persons. The lay persons were not asked to validate the questionnaire intended for HCPs.

Research ethics approval was granted by the Faculty Research Ethics Committee, Faculty of Medicine and Surgery of the University of Malta prior to dissemination of the questionnaire.

Recruitment of participants was carried out by means of convenience sampling. The questionnaire for the public was uploaded as Google Forms through social media via Facebook and LinkedIn and that for HCPs was disseminated through professional associations and community pharmacies. Prior to completing questionnaire, participants were given an information sheet explaining the nature and scope of the study. When data collection was executed in person, a box was used for respondents to place the completed questionnaire in it and remain anonymous. Responses were collected between June 2021 and December 2021.

## RESULTS

### Questionnaire for the Public

Four hundred participants completed the questionnaire of who 63% (n=250) were female. Forty-two percent (n= 166) of the participants were aged between 26-40 years and 42% (n=166) had a tertiary level of education. Prior to completing the questionnaire, 90% (n=361) of respondents had heard about CBD before and 77% (n=277) gained their knowledge about CBD from social media or news.

Ninety-six percent of participants (n=384) agreed that CBD has a therapeutic effect and 79% (n=314) believed that CBD has an analgesic effect whilst 45% (n= 180) believed that CBD has an anti-epileptic effect. Results of correlation between mean rating scores and age of participants were all statistically significant. When it comes to knowledge of participants about CBD, varying mean rating scores for provided statements were given with the highest mean rating scores seen in participants aged between 18-25 years of age indicating higher level of knowledge about CBD in this group of patients (Table 1).

Table 1: Knowledge of the public about CBD and age (N=400)

Statement	Age	Sample size	Mean Score	Std. Dev	P-value
CBD and THC are naturally occurring compounds derived from cannabis	18-25	89	4.39	0.685	<0.001
	26-40	166	4.32	0.771	
	41-60	107	4.01	0.976	
	60+	38	3.32	0.989	
CBD and THC produce different biological effects because they work differently	18-25	89	4.18	0.806	<0.001
	26-40	166	4.10	0.868	
	41-60	107	3.88	1.016	
	60+	38	3.21	0.963	
CBD has a lower risk of producing mental effects compared to THC	18-25	89	3.96	0.852	<0.001
	26-40	166	3.90	0.909	
	41-60	107	3.49	1.093	
	60+	38	3.08	0.969	
CBD is available in several formulations	18-25	89	4.48	0.725	<0.001
	26-40	166	4.45	0.798	
	41-60	107	4.02	1.046	
	60+	38	3.24	1.051	

Legality of CBD in the EU is unclear	18-25	89	3.57	0.976	0.034
	26-40	166	3.55	1.006	
	41-60	107	3.41	1.064	
	60+	38	3.05	1.038	
CBD dosing depends on weight, but there is no standard dose	18-25	89	3.81	0.928	<0.001
	26-40	166	3.80	0.820	
	41-60	107	3.58	0.962	
	60+	38	3.11	0.981	
CBD products do not interact with other medications	18-25	89	2.53	0.918	0.009
	26-40	166	2.92	1.012	
	41-60	107	2.74	0.935	
	60+	38	2.82	0.834	
CBD can cause a euphoric/high sensation	18-25	89	2.48	1.216	0.046
	26-40	166	2.39	1.089	
	41-60	107	2.42	1.158	
	60+	38	2.92	0.850	

The majority of participants (86%; n= 342) believed that CBD products without a marketing authorization should be legally available in Malta. Forty-seven percent (n=161) of participants who believed that CBD products should be available in Malta believed that it should be classified as prescription only medicine (POM) and 31% (n=106) believed it should be over the counter. The rest of the participants believed it should be available in general sales.

Participants who believed that CBD products should be available in Malta agreed more that CBD products available in health shops and pharmacies are of the same safety, quality and efficacy, that CBD products should be used in preference to conventional medicine and that HCPs should be able to prescribe or recommend CBD products (Table 2).

Table 2: Perceptions of the public about CBD (N=400)

Statements	Mean	Std. Dev
CBD products available in retail shops and pharmacies are of the same quality, safety and efficacy	3.15	1.294
Potential use of CBD might cause judgement or conflicts between healthcare professionals and patients	3.34	1.028
CBD products should not be used due to potential impairing effects on driving	2.51	1.135
CBD should only be legally available in pharmacies	3.47	1.356
CBD should be legally available in retail shops	2.47	1.387
CBD products recommended or prescribed by a healthcare professional (e.g., pharmacist, physician, nurse) are more likely to be used by patients	3.91	.950
CBD products should be used in preference to conventional medicine	3.04	1.154
CBD products should be used for minor ailments (e.g., headache, joint pain, minor sleep disorders)	3.25	1.274
CBD products should be used for major medical conditions (e.g., mental illness, epilepsy, cancer)	3.78	1.050
CBD should be classified as dangerous or harmful	2.11	1.149
Healthcare professionals should be able to recommend or prescribe CBD products	4.22	.853
CBD products intended for medicinal use should only be considered if there is no viable alternative medicine	2.58	1.248
CBD is very safe and has minimal side effects since it is a naturally occurring compound derived from cannabis	3.53	1.073
CBD use can lead to the use of more dangerous drugs (e.g., cocaine, heroin)	2.03	1.126
CBD products used for recreational purposes should be decriminalised	3.46	1.352

The major potential barrier to CBD use (66%; n= 262) was believed to be social stigma associated with the use of CBD for medicinal purposes. Fifty-six percent (n=224) of participants felt that personal beliefs of HCPs was another barrier to CBD use.

#### Questionnaire for HCPs

One hundred and fifty HCPs completed the questionnaire of who 59% (n=88) were female. The majority of HCPs (49%; n=73) were pharmacists. Most HCPs (43%; n= 64) had between 1 to 5 years of practice.

Prior to completing the questionnaire, 97% (n= 146) of HCPs had heard about CBD before and the majority (71%; n= 98) heard about CBD from social media or news. Sixty-one percent (n=91) encountered patients who asked them about CBD and its use.

When it came to HCPs' knowledge about CBD, respondents felt they were most knowledgeable about the 'different biological effects of CBD and THC', the 'effects of CBD on driving' and the 'legal status of CBD in Malta' (Table 3). There was no significant difference between the knowledge mean rating scores and profession or years of practice.

Table 3: Knowledge of healthcare professionals about CBD (n= 150)

<b>'I feel knowledgeable about':</b>	<b>Mean</b>	<b>Std. Deviation</b>
Mechanism of action of CBD	2.09	0.951
Mechanism of action of THC	2.01	0.966
Different biological effects of CBD and THC	2.21	1.001
Different toxic effects of CBD and THC	2.12	1.003
Different therapeutic effects of CBD and THC	2.21	0.971
EMA approved indications of CBD	1.83	0.995
FDA approved indications of CBD	1.65	0.956
Ratio of CBD/THC in Bediol®	1.89	1.344
Ratio of CBD/THC in Bedrocan®	1.92	1.344
Ratio of CBD/THC in Pedanios 20/1®	1.89	1.344
Ratio of CBD/THC in Pedanios 22/1®	1.89	1.344
Pharmacology of CBD	1.76	0.946
Safety profile of CBD (e.g., contraindications, cautions, drug interactions)	1.89	0.959
Likelihood of dependence or addiction from CBD use	2.18	1.081
Effects of CBD on driving	2.23	1.100
Likelihood of withdrawal symptoms upon stopping use of CBD	2.15	1.132
Legal status of CBD in Malta	2.52	1.180
Legal status of CBD in other European countries	2.02	1.108

HCPs believed that CBD has mostly an anxiolytic (n=60), analgesic (n=83) and anti-inflammatory effect (n= 39). The majority of HCPs believed that sedation and somnolence are common to very common side effects caused by CBD followed by fatigue (n=79) and increased appetite (n=79). Fever (n=90) was believed to be a rare to very rare side effect of CBD followed by infections (n=80). One HCP believed that incontinence when overdosing was a very common side effect of CBD and another HCP believed that nausea was a common side effect of CBD.

One hundred and twelve (75%) HCPs were not aware that there is only one Food and Drug Administration (FDA) and European Medicines Agency (EMA) approved CBD-based product called

Epidiolex/Epidyloex and out of these, 54 were pharmacists and 25 medical doctors.

Sixty percent (n=90) of HCPs believed that Epidyloex should be available in Malta and 67% (n=101) of HCPs believed that CBD products should be classified as Prescription Only Medication. The HCPs who believed that CBD should be classified as general sales had between 1 and 5 years of practice.

HCPs feel that there is a lack of education and misconceptions among the general public about CBD and its use in medical conditions. They believed that CBD for medicinal use should be manufactured only in appropriately licensed EU Good Manufacturing Practice certified facilities (Table 4).

Table 4: Perception of Healthcare Professionals about CBD (N=150)

Statements	Mean	Std. Deviation
There is a lack of education among the general public about CBD and its use in medical conditions	4.41	0.812
There is not enough data about the side effects of CBD-only products	3.31	1.081
CBD products for medicinal use should be available for prescribing or recommending	3.99	0.969
CBD-only products should only be legally available in pharmacies	4.17	1.048
CBD-only products should be legally available in retail shops	1.84	1.087
CBD-only products should not be prescribed or recommended due to potential impairing effects on driving	2.37	1.007
CBD-only products should be prescribed or recommended for minor ailments (e.g., headache, joint pain, minor sleep disorders) in preference to conventional medicine	2.57	1.138
CBD is very safe and has minimal side effects since it is a naturally occurring compound derived from cannabis	2.89	1.150
CBD-only products intended for medicinal use should only be considered if there is no viable alternative medicine	2.99	1.187
CBD-only products should be available on prescription only, to avoid misuse and abuse of such products	3.66	1.345
CBD-only should be classified as a dangerous or harmful drug	2.59	1.265
There are misconceptions among general public about CBD use	4.00	0.941
Healthcare professionals are concerned about a patient's perception of a healthcare professional prescribing or recommending CBD for medicinal use	3.38	1.008
CBD use will lead to the use of more dangerous drugs (e.g., cocaine, heroin)	2.27	1.053
CBD for medicinal use should be manufactured only in appropriately licensed EU GMP certified facilities	4.31	0.962
The quality between CBD products used for recreational purposes and for medicinal use should be the same	3.24	1.422
The use of CBD-only products for recreational purposes should be decriminalised	3.17	1.308

The majority of HCPs felt comfortable prescribing or recommending CBD for pain conditions (69%; n=104) and insomnia (50%; n=75). HCPs were not comfortable with

prescribing or recommending CBD for schizophrenia (63%; n=95), autism (57.3%; n= 86) and Alzheimer's disease (54%; n=81) (Table 5).

Table 5: Healthcare professionals' level of comfort in prescribing or recommending CBD in various medical conditions (N=150)

Would you feel comfortable prescribing or recommending CBD in?			
	Yes	No	Maybe
<b>Anxiety</b>	44.7%	24.7%	30.6%
<b>Arthritis</b>	42%	28.7%	29.3%
<b>Alzheimer's Disease</b>	20%	54%	26%
<b>Autism</b>	16.7%	57.3%	26%
<b>Cancer</b>	45.3%	29.3%	25.3%
<b>Depression</b>	36%	28.7%	35.3%
<b>Epilepsy</b>	37.3%	35.3%	27.3%
<b>Hypertension</b>	10%	57.3%	32.7%
<b>Inflammation</b>	35.3%	34%	30.7%
<b>Insomnia</b>	50%	25.3%	24.7%
<b>Migraine</b>	41.3%	29.3%	29.3%
<b>Multiple Sclerosis</b>	36.7%	32%	31.3%
<b>Nausea and vomiting</b>	26.7%	47.3%	26%
<b>Pain</b>	69.3%	16%	14.7%
<b>Parkinson's Disease</b>	32.7%	43.3%	24%
<b>Post-Traumatic Stress Disorder</b>	38%	38%	24%
<b>Schizophrenia</b>	16%	63.3%	20.7%
<b>Skin conditions e.g., eczema, psoriasis</b>	26.7%	51.3%	22%

The most common potential barrier related to CBD use was believed to be personal beliefs of HCPs (65%; n= 98). There was no significant association between potential barriers related to CBD use and HCP's gender, age, profession and years of practice.

## DISCUSSION

Although members from the general public heard about CBD and agreed that it has therapeutic effects, less than half of the respondents knew that it has an anti-epileptic effect. The majority of respondents believe that CBD has an analgesic effect, even though to date, there is no FDA or EMA approved CBD medicinal product indicated for pain. Pain is a common indication for which CBD is used<sup>21</sup>. A lack of knowledge amongst members of the general public and consumers on CBD was reported in other studies<sup>22-24</sup>. In this study the highest mean knowledge rating scores were attained by the younger participants aged between 18-25 years of age. A study conducted by Casanova et al, reported that awareness on CBD was associated with a younger age<sup>25</sup>. More permissive attitudes related to cannabis amongst young people are more evident in countries where medical cannabis laws are passed, such as Malta<sup>26</sup>.

Participants believed that CBD-only products should be classified as POM. These results agree with findings from the study conducted by Leszko and Meenrajan where participants suggested that CBD products should not be OTC<sup>15</sup>. Participants perceive that CBD products available in health shops and pharmacies have the same quality, safety and efficacy. Bonn-Miller et al and Mazzetti et al claimed that analysed cannabinoid concentrations in CBD products differed from the ones stated on the product label<sup>27,28</sup>. To date there is no locally conducted study describing analysis of cannabinoids in commercially available cannabis products. There is a need for analysing CBD products available on the Maltese market to verify whether concentrations stated on product labels reflect actual cannabinoid concentrations in the products.

Respondents from the public agreed that HCPs should be able to recommend or prescribe CBD products with the majority of participants believing that CBD products recommended by HCPs such as a pharmacists, physicians or nurses are more likely to be used by patients. In a study conducted by Schilling et al, participants disagreed that CBD is a dangerous or harmful drug<sup>17</sup>. Individuals who believed that CBD-only products should be available in Malta believe that CBD products should be used in preference to conventional medicine and that CBD products should be used for both minor and major ailments. Studies conducted by Berg et al and Lovecchio et al found CBD to be beneficial in the management of pain, insomnia and anxiety among other conditions<sup>22,29</sup>. Although CBD is found effective in reducing pain<sup>17</sup> there are limited high quality randomized control trials about the use of CBD in reducing and managing pain and other conditions and about the efficacy and safety of cannabis products<sup>30,31</sup>.

Social stigma associated with the use of CBD and potential judgement of HCPs were barriers to CBD use reported by members of the public which were also concerns reported in other studies<sup>15,16,32,33</sup>.

Results from the HCPs questionnaire demonstrated that HCPs were somewhat knowledgeable about certain aspects on CBD such as biological effects and not knowledgeable about others such as available FDA/EMA approved products. Link et al claimed that pharmacists lacked knowledge about CBD products and felt unprepared or incompetent in advising patients<sup>13</sup>. Unpreparedness and lack of knowledge could be due to the limited available scientific data on CBD to help guide professionals and inadequate training<sup>14,34</sup>. Being more knowledgeable about CBD could lead to a more positive attitude towards prescribing it<sup>35</sup>.

More HCPs agreed that CBD produces an analgesic effect rather than an anti-epileptic effect. Although CBD is found effective in reducing pain<sup>17</sup>, pain is not an indication for which

Epidyolex/Epidiolex is approved for. Sedation and somnolence were believed to be common to very common side effects caused by CBD whilst fever and infections were considered to be rare to very rare side effects. These results indicate varying levels of knowledge since side effects listed in the questionnaire were all common to very common side effects cause by Epidyolex/Epidiolex<sup>12</sup>. The majority of HCPs were not aware of Epidyolex/Epidiolex, the only FDA/EMA approved CBD-based product<sup>9,21</sup>.

The majority of HCPs believe that CBD-only products should be classified as POM. CBD is qualified as a novel food and under European law is not considered as being a narcotic drug<sup>9</sup>. In this study, HCPs with the least years of practice stated that CBD should be available in general sales rather than as POM or OTC. The way practitioners regard MC and CBD is related to the circumstances encountered throughout their career<sup>36</sup>. HCPs with fewer years of practice might be more willing and open and might have had positive experiences related to CBD and the advocacy of its use.

HCPs claimed that CBD products should be available for prescribing or recommending. Should CBD be classified as an OTC product, pharmacists would play an important role when it comes to recommending it as a non-prescription medicine<sup>37</sup>. Patients have reported to be more comfortable if HCPs prescribed CBD products for use<sup>17</sup>. The majority of HCPs would feel comfortable in prescribing CBD products for pain and insomnia. Schizophrenia, autism and Alzheimer's Disease were the conditions for which HCPs were the least comfortable prescribing CBD. Haug et al reported that HCPs would likely recommend CBD for Alzheimer's Disease and epilepsy<sup>38</sup>.

Personal beliefs of HCPs and risk of being judged by HCPs were the main barriers to CBD use reported in both questionnaires. Patients' fear of being judged by their HCPs due to their personal beliefs on CBD and social stigma related to CBD use were also barriers reported in a study by Sharma et al<sup>39</sup>.

### Study Strengths and Limitations

The study is the first to gather the knowledge and perceptions about CBD use of members of the Maltese public and Maltese HCPs and sheds light on the need for more research and education about CBD and MC. Limitations of the study included the lack of open-ended questions in the questionnaire which could have gathered more data regarding knowledge and perceptions about CBD from respondents. Having a larger number of respondents for both questionnaires would yield more representative data. During dissemination of the questionnaires four MC products (Bedrocan® 22/1, Bediol®, Pedanios® 20/1 and Pedanios® 22/1) were available on the market and mentioned in the questionnaire for the HCPs. Since then, more MC products are available on the Maltese market. During dissemination of the questionnaires CBD products (excluding CBD found in MC) were not legally available in Malta, as they are now and responses provided might not be indicative of the current knowledge and perceptions about CBD.

## CONCLUSION

Respondents from the general public were mostly knowledgeable about CBD and its use even though HCPs claim that there is a lack of education among the general public about CBD and its use in medical conditions. Members of the public had positive perceptions in relation to CBD and like HCPs, feel more comfortable should CBD be a POM or be recommended by a HCP. HCPs were not so knowledgeable about certain aspects on CBD. There is a need for increased research, awareness, education and training about cannabis and CBD to HCPs and students<sup>1,39-47</sup>. Increased research, knowledge and availability of prescribing information and guidelines related CBD use might lead to an increased willingness of HCPs to recommend

CBD and lead to a decrease in potential barriers associated with its use.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## AUTHOR CONTRIBUTIONS

*Abigail Calleja*: Main researcher, collected and analyzed data.

*Janis Vella Szijj*: Supervisor, drafted manuscript and corresponding author.

*Anthony Serracino Inglott*: Supervisor and reviewer.

*Lilian M. Azzopardi*: Head of Department and Reviewer.

## DATA AVAILABILITY STATEMENT

Data underlying this article is available in the University of Malta Open Access Repository at <https://www.um.edu.mt/library/oar/handle/123456789/103954>

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