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Pancreatic Cancer and Hospital Management in Portugal: An Epidemiological View

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1. Theoretical Framework – Background

The incidence of pancreatic cancer is increasing worldwide with a greater than 2-fold increase observed in the last 30 years [1] (see Charts 1 and 2 in the Appendix). It is the third leading cause of death from malignant tumors in the United States [2] and the fourth in Europe [3, 4].

Pancreatic cancer can originate from endocrine or exocrine pancreatic cells. The most common pancreatic cancers are those from exocrine origin, such as pancreatic adenocarcinoma, which are extremely aggressive and potentially lethal [5, 6]. The mortality rates related to these types of tumors have increased substantially, including in Portugal, with a 2-fold increase over 25 years (from 1991 to 2015), which reflects an annual increase of approximately 3% [5].

According to the World Pancreatic Cancer Coalition, approximately 1,300 new cases of pancreatic cancer are diagnosed every year in Portugal. Upon diagnosis, curative treatments (adenocarcinomas) cannot be offered for most patients. Nevertheless, an increase in the incidence of pancreatic tumors which can be managed with curative treatments – namely neuroendocrine tumors and pancreatic cystic neoplasms – has been observed [5].

That said, it is essential that awareness campaigns aimed to educating the population about the characteristics of pancreatic cancer be encouraged. By promoting early diagnosis through the identification of warning signs and raising awareness on preventive measures and risk factors, the access to reference centers may be increased, resulting in short- and long-term cost reductions [7], and increases in long-term survival [5].

Regarding cancer, the National Health Plan in Portugal aims to decrease the number of cases of preventable cancers and diagnostic delays by focusing on prevention and early diagnosis measures; it also aims to reduce the burden of the disease on the patients and their families, as well as ensure equal and accessible treatment to all citizens. One of the goals of the National Health Plan is to ensure that 75% of all pancreatic cancers are treated in reference centers [8].

2. Epidemiologic Characteristics

Adenocarcinoma (exocrine pancreatic cancer) is the most common pancreatic cancer (95% of all cases) [9].

Pancreatic cancer has the lowest survival rate among all cancers in Europe and is the third most common digestive system neoplasm in Portugal, behind colon and stomach cancer; also, it is the seventh leading cause of death from malignant tumors (Table 1 – Appendix). It has a higher prevalence in men (Table 2 – Appendix), and overall mortality is higher at ages 75-79 (Table 3 – Appendix). However, the number of deaths at earlier ages seems to be increasing.

Currently, the mean 5-year survival rate is of 3% to 9%. Life expectancy upon diagnosis is of 4.6 months, and the number of deaths due to pancreatic cancer has almost doubled in the last three decades. In a recent study conducted in Portugal, a 2-fold increase on the number of deaths from pancreatic cancer over the last 25 years has been observed – i.e., more than 1,500 deaths per year in 2017 [10, 11, 12].

According to current data from the National Institute of Statistics (INE, 2019), the number of deaths from pancreatic cancer is ap-

parently higher in the Metropolitan Area of Lisbon, followed by the North and Central parts of the country (Table 4 – Appendix). However, these data need to be further evaluated.

There seems to be a trend toward progressive increases in deaths from pancreatic cancer as well as an increase in prevalence in men, according to an evaluation conducted by INE on deaths occurred between 1990 and 2019 (Table 5 – Appendix) [13, 14].

It is estimated that two thirds of the most common risk factors associated with pancreatic cancer are potentially modifiable, which represents an opportunity for disease prevention. These are: chronic smoking (75% higher risk compared to non-smokers), obesity (47% higher risk compared to individuals with BMI within the normal range), diabetes mellitus (50% higher risk for individuals older than 50 years of age and who have been diagnosed with diabetes for less than four years compared with those who have been diagnosed with diabetes over 5 years); chronic pancreatitis (4% of the patients will develop pancreatic cancer); familial predisposition (higher risk for individuals with two first-degree relatives affected or 3 relatives diagnosed with the disease being at least one of them a first-degree relative or presenting with hereditary genetic syndromes, such as Peutz-Jeghers syndrome). Studies indicate that 5% to 10% of all cases of pancreatic cancer are related to genetic conditions [15].

Table 1: Deaths by geographic distribution of residence (NUTS I/II/III) and gender, according to the cause of death (ICD-10 - European short list). Data obtained from the Death Certificate Information System available until February 17, 2020. Source: INE

Distribuicao geografica de residenciae sexo		LES - 07 Tumores malignos	LES - 08 Tumor malingo do labio, cavidade bucal e faringe	LES - 09 Tumor malgno do esofago	LES - 10 Tumor maligno do estomago	LES - 11 Tumor maligo do colon	LES - 12 Tumor maligno do reto e anus	LES - 13 Tumor maligno do figado e das vias blreas intra-hepaticas	LES - 14 Tumor maligno do pancreas	LES - 15 Tumor maligno da laringe e traqueia/ bronquios/ pulmao	LES - 16 Tumor maligno da pele	LES - 17 Tumor maligno da mama	LES - 18 Tumor maligno do colo do utero	LES - 19 Tumor maligno de outras partes do utero	LES - 20 Tumor maligno do ovario	LES - 21 Tumor maligno da prostata	LES - 22 Tumor maligno do rim	LES - 23 Tumor maligno da bexiga	LES - 24 Tumor maligno do tecido infatico/ hemato poetico
Total	HM	28,544	829	552	2,249	2,624	1,205	1,266	1,653	4,717	265	1,909	221	494	391	1,903	454	867	2,453
	H	16,865	682	477	1,367	1,477	744	928	894	3,569	144	29	//	//	//	1,903	296	652	1,347
	M	11,679	147	75	882	1,147	461	338	759	1,148	121	1,880	221	494	391	//	158	215	1,106
portugal	HM	28,464	826	548	2,246	2,620	1,204	1,261	1,649	4,703	264	1,902	221	494	391	1,901	454	865	2,439
	H	16,815	680	474	1,366	1,474	743	926	892	3,557	143	29	//	//	//	1,901	296	650	1,336
	M	11,649	146	74	880	1,146	461	335	757	1,146	121	1,873	221	494	391	//	158	215	1,103
Continente	HM	27,188	777	518	2,167	2,551	1,151	1,208	1,583	4,462	252	1,803	206	467	375	1,835	441	825	2,330
	H	16,085	636	451	1,320	1,442	706	891	851	3,369	136	28	//	//	//	1,835	287	618	1,281
	M	11,103	141	67	847	1,109	445	317	722	1,093	116	1,775	206	467	375	//	154	207	1,049

Table 2: Deaths by nature (ICD-10 - European short list) and gender, according to the month of death. Data obtained based on information from the Death Certificate Information System available until February 17, 2020. Source: INE

Causa de morte e sexo		Total	janeiro	Fevereiro	Marco	Abril	Maio	Junho	Julho	Agosto	Setembro	Outubro	Novembro	Dezembro
LES - 12 Tumor maligno de reto e anus	HM	1,205	101	89	100	103	91	93	119	106	87	112	110	94
	H	744	67	55	61	60	55	59	72	60	57	67	69	62
	M	461	34	34	39	43	36	34	47	46	30	45	41	32
LES - 13 Tumor maligno do figado e das vias billiares intrahepaticas	HM	1,266	115	105	109	91	107	101	109	105	105	114	92	113
	H	928	92	78	88	63	77	75	83	71	80	80	69	72
	M	338	23	27	21	28	30	26	26	34	25	34	23	41
LES - 14 Tumor maligno do pancreas	HM	1,653	146	125	137	124	127	137	148	124	169	142	128	146
	H	894	82	64	71	68	67	73	80	67	96	91	63	72
	M	759	64	61	66	56	60	64	68	57	73	51	65	74
LES - 15 Tumor maligno da larginge e traqueia/ bronquios/ pulmao	HM	4,717	425	360	399	374	375	394	368	429	370	411	408	404
	H	3,569	321	269	307	272	294	289	290	320	281	305	313	308
	M	1,148	104	91	92	102	81	105	78	109	89	106	95	96
LES - 16 Tumor maligno da pele	HM	265	22	24	30	18	22	22	20	22	20	22	21	22
	H	144	10	12	17	5	13	11	15	10	12	15	11	13
	M	121	12	12	13	13	9	11	5	12	8	7	10	9
Les - 17 Tumor maligno da mama	HM	1,909	171	160	158	149	178	157	155	146	160	139	158	167
	H	29	5	4	1	5	0	2	2	1	5	2	1	1

Table 3: Deaths by nature (ICD-10 - European short list) and gender, according to age group. Data obtained based on information from the Death Certificate Information System available until February 17, 2020. Source: INE

Causa de morte e sexo		Total		0 a 64															65 e +					
			Total	0-4			5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	Total	65-69	70-74	75-79	80-84	85e+
				Total	0	1-4																		
LES - 11 Tumor maligno do colon	HM	2,642	446	0	0	0	0	0	0	1	0	5	10	26	46	79	101	178	2178	244	320	372	511	731
	H	1477	256	0	0	0	0	0	0	0	0	1	0	12	25	45	57	116	1224	153	189	228	306	345
	M	1147	190	0	0	0	0	0	0	1	0	4	10	14	21	34	44	62	957	91	131	144	205	386
LES - 12 Tumor maligno de reto e anus	HM	1205	262	0	0	0	0	0	0	0	3	3	3	13	30	43	78	89	943	129	147	142	242	283
	H	744	171	0	0	0	0	0	0	0	2	1	1	9	19	29	50	60	573	90	95	92	142	154
	M	461	91	0	0	0	0	0	0	0	1	2	2	4	11	14	28	29	370	39	52	50	100	129
LES - 13 Tumor maligno do figado e das vias biliares intra-hepaticas	HM	1266	367	0	0	0	0	1	0	1	2	3	2	11	22	54	110	161	899	161	209	181	176	172
	H	928	303	0	0	0	0	1	0	0	2	0	1	8	19	47	94	131	625	132	159	133	108	93
	M	338	64	0	0	0	0	0	0	1	0	3	1	3	3	7	16	30	274	29	50	48	68	79
LES - 14 Tumor maligno do pancreas	HM	1653	328	0	0	0	0	0	1	0	0	2	4	8	25	55	101	132	1325	193	270	280	274	308
	H	894	212	0	0	0	0	0	0	0	0	2	2	6	19	37	66	80	682	123	155	147	134	123
	M	759	116	0	0	0	0	0	1	0	0	0	2	2	6	18	35	52	643	70	115	133	140	185
LES - 15 Tumor maligno da laringe e traqueia/ bronquios/pulmao	HM	4717	1507	0	0	0	0	0	0	0	2	2	17	53	123	254	420	636	3210	718	761	635	575	521
	H	3569	1145	0	0	0	0	0	0	0	0	2	12	39	81	185	325	501	2424	572	601	479	431	341
	M	1148	362	0	0	0	0	0	0	0	2	0	5	14	42	69	95	135	786	146	160	156	144	180
LES - 16 Tumor maligno da pele	HM	265	83	0	0	0	0	0	0	0	1	3	5	6	12	16	16	24	182	34	37	26	34	51
	H	144	46	0	0	0	0	0	0	0	1	1	3	3	6	8	5	19	98	14	25	15	18	26
	M	121	37	0	0	0	0	0	0	0	0	2	2	3	6	8	11	5	84	20	12	11	16	25
LES -17 Tumor maligno da mama	HM	1909	634	0	0	0	0	0	0	0	1	18	37	72	100	108	159	139	1275	151	184	184	264	492
	H	29	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	25	2	3	6	8	6

Table 4: Deaths by Causes of Death, data obtained based on information from the Death Certificate Information System available until February 17, 2020. Source: INE

Distribuicao geografica de residencia e sexo		LES-07 Tumores malignos	LES-08 Tumor maligno do labio, cavidade bucal e faringe	LES-09 Tumor maligno do esofago	LES-10 Tumor maligno do estomago	LES-11 Tumor maligno do colon	LES-12 Tumor maligno do reto e anus	LES-13 Tumor maligno do figade e das vias biliares intra-hepaticas	LES-14 Tumor maligno do pancreas	LES-15 Tumor maligno da laringe e traqueia/ bronquios	LES-16 Tumor malingo da pele	LES-17 Tumor malingo da mama	LES-18 Tumor malingo do colo do utero	LES-19 Tumor malingo de outras partes do utero	LES-20 Tumor malingo do ovario	LES-21 Tumor malingo da prostata	LES-22 Tumor malingo do rim	LES- 23 Tumor malingo da bexiga	LES-24 Tumor malingo do tecido linfatico/ hematopoetico
Norte	HM	9,091	288	202	921	805	334	415	483	1698	72	523	60	134	111	551	146	267	706
	H	5491	232	173	556	445	189	303	267	1304	37	8	//	//	//	551	92	188	391
	M	3600	56	29	365	360	145	112	216	394	35	515	60	134	111	//	54	79	315
Centro	HM	6689	181	122	472	664	312	308	402	901	55	466	38	109	92	535	96	211	588
	H	3897	146	113	282	378	194	237	202	670	31	5	//	//	//	535	63	150	335
	M	2792	35	9	190	286	118	71	200	231	24	461	38	109	92	//	33	61	253
A.M. Lisboa	HM	7817	218	141	542	723	308	365	500	1306	81	574	75	154	115	480	128	225	716
	H	4514	183	117	326	404	194	264	278	964	49	9	//	//	//	480	82	177	371
	M	3303	35	24	216	319	114	101	222	342	32	565	75	154	115	//	46	48	345
Alentejo	HM	2312	60	24	163	254	131	83	123	327	19	148	20	52	41	170	46	76	210
	H	1384	49	21	108	150	86	58	75	254	7	3	//	//	//	170	29	63	117
	M	928	11	3	55	104	45	25	48	73	12	145	20	52	41	//	17	13	93
Algarve	HM	1279	30	29	69	105	66	37	75	230	25	92	13	18	16	99	25	46	110
	H	799	26	27	48	65	43	29	39	177	12	3	//	//	//	99	21	40	67
	M	480	4	2	21	40	23	8	36	53	13	89	13	18	16	//	4	6	43
R.A. Acores	HM	653	17	13	38	24	22	22	36	152	5	50	10	14	4	29	7	32	47
	H	391	15	11	22	13	20	16	18	118	3	0	//	//	//	29	4	25	23
	M	262	2	2	16	11	2	6	18	34	2	50	10	14	4	//	3	7	24
R.A. Madeira	HM	622	32	17	40	45	31	31	30	89	7	49	5	13	12	37	6	8	62
	H	338	29	12	23	19	17	19	13	70	4	1	//	//	//	37	5	7	32
	M	284	3	5	17	26	14	12	17	19	3	48	5	13	12	//	1	1	30

Table 5: Deaths by causes of death (ICD-10 - European short list) and gender in the country, from 1999 to 2019 (excerpt). Source: INE.

4.1: Óbitos por causa de morte (CID-10 - lista europeia sucinta) e sexo, no país, 1999 a 2019												
Causa de morte	Sexo	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
LES - 11 Tumor maligno do cólon	HM	2 590	2 650	2 743	2 691	2 725	2 690	2 621	2 655	2 704	2 604	2 624
	H	1 438	1 514	1 501	1 538	1 560	1 528	1 510	1 480	1 557	1 473	1 477
	M	1 152	1 136	1 242	1 153	1 165	1 162	1 111	1 175	1 147	1 131	1 147
LES - 12 Tumor maligno do reto e ânus	HM	1 058	1 114	1 086	1 122	1 123	1 118	1 226	1 254	1 148	1 216	1 205
	H	669	712	675	702	677	672	789	757	716	747	744
	M	389	402	411	420	446	446	437	497	432	469	461
LES - 13 Tumor maligno do fígado e das vias biliares intra-hepáticas	HM	861	895	979	969	1 037	1 090	1 134	1 171	1 231	1 240	1 266
	H	607	611	693	690	726	777	817	845	898	896	928
	M	254	284	286	279	311	313	317	326	333	344	338
LES - 14 Tumor maligno do pâncreas	HM	1 200	1 250	1 292	1 299	1 376	1 362	1 423	1 538	1 551	1 678	1 653
	H	672	680	691	700	732	742	753	860	799	880	894
	M	528	570	601	599	644	620	670	678	752	798	759
LES - 15 Tumor maligno da laringe e traqueia / brônquios / pulmão	HM	3 833	4 046	4 077	4 012	4 336	4 301	4 326	4 434	4 563	4 631	4 717
	H	3 076	3 280	3 242	3 180	3 462	3 427	3 326	3 469	3 537	3 576	3 569
	M	757	766	835	832	874	874	1 000	965	1 026	1 055	1 148

3. Problems Identified

The first problem identified regarding pancreatic cancer is that it usually presents with insidious symptoms and is often diagnosed at advanced stages thus having poor prognosis. Symptoms vary according to the location of the tumor and are relatively non-specific, such as abdominal pain, loss of appetite, weight loss, fatigue, and jaundice, the latter occurring when the tumor reaches the head of the pancreas and causes an obstruction of the biliary tract. Another problem is the lack of well-defined screening strategies for the general population: there are no readily available and highly accurate diagnostic tests that could enable massive screening of pancreatic cancer in the general population. Screening is usually performed on those who have high-risk family history of developing pancreatic cancer.

Diagnosis of pancreatic cancer includes physical examination and diagnostic imaging tests, such as abdominal ultrasound, computed tomography (CT) scan, magnetic resonance imaging (MRI), and endoscopy. Improved ultrasound and MRI techniques have increased the capacity to detect pancreatic lesions. However, these tests still have important limitations since they are unable to detect and distinguish other lesions from pancreatic intraepithelial neoplasms [16].

Considering diagnostic tests of pancreatic cancer, it is essential to identify and validate new biomarkers, preferably tested in blood samples, that have high sensitivity and specificity and that could enable accurate and early diagnosis of pancreatic cancer, even before the tumor is detected on imaging scans [17].

Recent data suggest that the potential of circulating DNA and other markers (CancerSEEK) are highly specific and relatively sensitive for the detection of pancreatic cancer both in general and high-risk populations. However, more studies on stratified high-risk groups and based on the natural history of precursor lesions are needed [16].

4. Possible Solutions - Interventions

Considering that pancreatic cancer is the seventh leading cause of death from malignant neoplasms in Portugal, strategies aimed at prevention, diagnosis, and interventions for this disease are urgently needed.

Surgery is the only potential curative treatment for pancreatic cancer and, even so, patients who undergo surgical resection have an estimated survival rate of only 10%. Better results are observed when surgical resection is combined with neoadjuvant or adjuvant chemotherapy. Interestingly, recent studies comparing the financial costs of pancreatic cancer surgery performed in high-volume versus low-volume hospitals did not show significant differences. Even though surgeries performed at high-volume hospitals have superior outcomes in terms of morbidity and mortality (Graph 3 – Appendix), management of complications, and readmission rates, a potential reduction in financial costs was not observed. This could result from a global improvement in all outcomes or from low-volume hospitals selecting less complex cases [7]. Campaigns designed to promote cancer awareness and education, such as the World Pancreatic Cancer Day, as well as other educational activities, contribute for the recognition of behavioral risks and other risk factors for pancreatic cancer. They might have a positive impact on the adoption of preventive measures by the general population. Another example of an educational activity is the program Promoção da Literacia em Saúde sobre Estilos de Vida Saudável, that promotes education on healthy lifestyle and is carried out by the Directorate-General of Health (GDS) of Portugal. Besides, the participation in different Joint Actions and in other international projects enabling financial aid for the promotion of interventions, international European benchmarking, good practices adoption, and the conduction of the Health Literacy Survey to be concluded by 2020 also contribute for raising awareness for pancreatic cancer [8]. By ensuring access to information for the scientific and medical communities, an increase in research and a greater awareness for pancreatic cancer are expected.

The implementation of Reference Centers was essential since they are highly specialized and able to provide high quality treatments using state of the art techniques and technologies. Also, these specialized centers gather more information and expertise on pancreatic cancer and can foster scientific research and promote knowl-

edge acquisition aimed at diagnosing and treating this complex disease. Thus, reference centers are vital for multidisciplinary and interdisciplinary approaches [18, 19]

There are ten official Adult Oncology Centers of Excellence in Hepatobiliopancreatic Cancer in Portugal. They are officially recognized by the Portuguese Ministry of Health and their implementation has been recommended by the National Commission for Reference Centers (Table 6 – Appendix) [20].

These centers enable the development of specific actions, such as:

- Screening of pancreatic cancer in specific subgroups according to current practices in other European centers.

- Stimulating close collaboration of clinical and translational research teams.

- Innovating new generation complementary diagnostic tools integrated with artificial intelligence algorithms. These diagnostic tools may facilitate the early diagnosis of pancreatic cancer as well as the development of safer and more effective surgical protocols, or new techniques, together with neoadjuvant therapy.

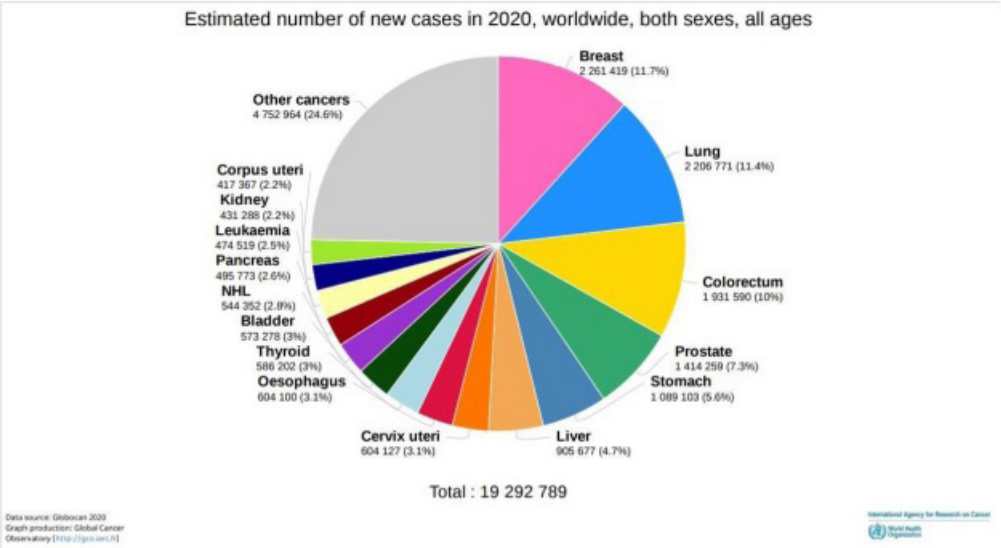
- Offering research fellowships so that studies to identify potentially relevant biomarkers for diagnostic, prognostic or therapeutic evaluation purposes can be conducted, as well as research on the reformulation of new therapeutic targets.

- Enabling access to novel therapies, such as echo-endoscopy ultrasound guided techniques to directly inject antitumor or imunnoregulatory (such as dendritic cells) agents into the tumor mass. This approach has shown promising results in patients with locally advanced pancreatic cancer.

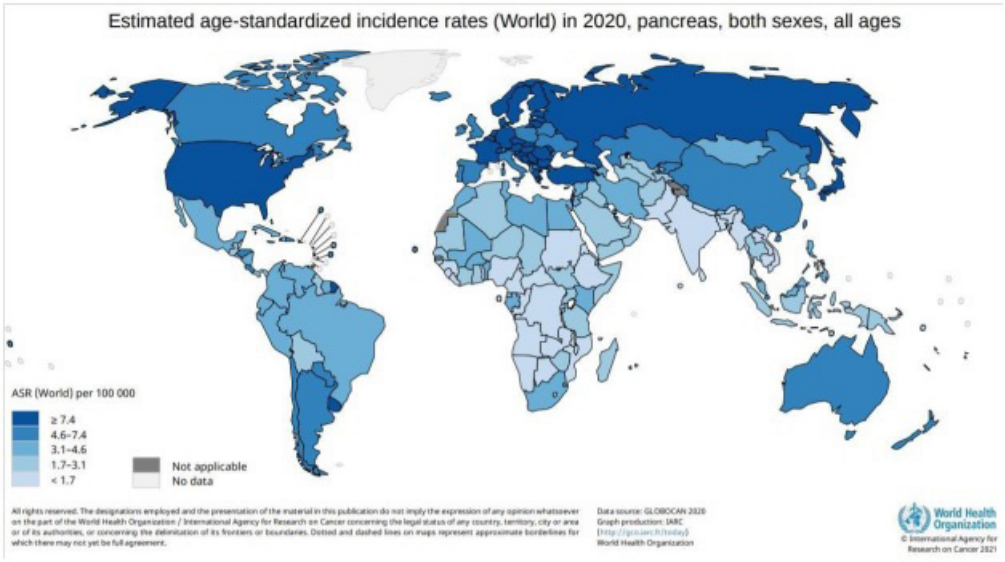
- Providing access to a digital platform where knowledge and protocols of cooperation can be shared with several reference centers. This initiative strengthens prevention, diagnosis, and intervention processes both qualitative and quantitatively [20, 21].

Table 6: Adult Oncology Reference Centers for Hepato-Bilio-Pancreatic Cancers.

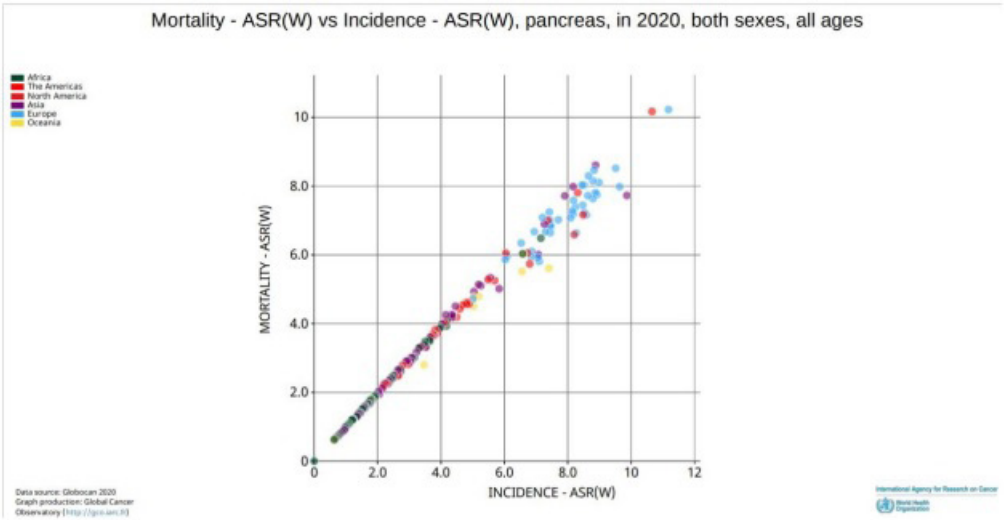
Adult Oncology Reference Centers - Hepato-Bilio-Pancreatic Cancer:
Centro Hospitalar de Entre o Douro e Vouga, EPE.
Centro Hospitalar de Leiria, EPE
Hospital Santa Maria (Centro Hospitalar de Lisboa Norte,EPE)
Hospital Curry Cabral (Centro Hospitalar Universitário Lisboa Central, EPE)
Hospital Prof. Doutor Fernando Fonseca, EPE.
Sociedade Gestora do Hospital de Loures, S.A. - Hospital Beatriz Ângelo
Hospital Santo António (Centro Hospitalar Universitário Porto, EPE)
Hospital São João (Centro Hospitalar Universitário de S. João, EPE)
Instituto Português de Oncologia Francisco Gentil, EPE
Hospitais da Universidade de Coimbra (Centro Hospitalar e Universitário de Coimbra, EPE)



Graph 1: Worldwide estimation of new cancer cases, by organ, in 2020.



Graph 2 - Incidence of pancreatic cancer, by age, worldwide.



Graph 3 - Mortality .vs Incidence of Pancreatic Cancer in 2020.

5. Required Resources

In the United States, the average total cost of surgical treatments of pancreatic cancer per patient is $61,700. This cost is higher for patients with resectable locoregional disease ($134,700) compared with those who have unresectable locoregional or metastatic disease ($65,300 and $49,000, respectively) 22. In Europe, 610,000 to 915,000 quality-adjusted life years (QALYs) are lost due to pancreatic cancer [23]. There is an urgent need for financial resources directed to improving quality of life in pancreatic cancer. It seems to be a good approach to make financial investments in oncology centers.

Treatments of pancreatic and hepatobiliary cancers have evident technical advantages in reference centers compared with other centers in the United States ($p < 0.001$): general complications (16.5% vs. 23.6%), readmission within 90 days (26.2% vs. 30.2%), and 90-day mortality (3.0% vs. 8.7%) [7].

In Portugal, reference centers have well-defined human and technical resources established by law. They receive a minimal number of cases per year, being 20 new pancreatic cancer surgical cases (including periampullary tumors), and at least 40 Clinical Oncology cases (including metastatic disease). There are more centers available at the North and Central areas of Portugal, and service is not available at all parts of Alentejo, Algarve, or at the Autonomous Regions Madeira and Azores.

Despite the above mentioned information, we could not find official statistical data on treatment costs and the results observed. As a matter of fact, the 2019 DGS activity report [8] concluded that the maximum response time (TMRG) for surgery is not met, according to the analysis of activities carried out by the Portuguese National Health Service (SNS). Evaluations of oncology service capacity are being conducted at the SNS units. A combination of both human and technological resources is needed to standardize indicators in these reference centers thus enabling the referral of

patients diagnosed with pancreatic cancer to them in a timely manner (time between the diagnosis and the first appointment at a reference center).

By evaluating these indicators, it will be possible to assess if the Portuguese National Program for Oncological Diseases (PNDO) is adopting effective measures and meeting defined goals, as follows: a) Promotion and dynamic monitoring of screening programs in terms of efficacy, equity, and achieved health gains; b) Definition of the profile of cancer treatment centers and integration within the Portuguese cancer care system; c) Promotion of equitable access to high quality cancer treatment [24].

More studies to gather data from screening programs on the efficacy, cost-effectiveness, and impact on the morbimortality of pancreatic adenocarcinoma are needed. A randomized, prospective study to evaluate the impact on survival rates and QALYS gains in screened vs. non-screened groups is highly recommended [16].

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