

**The History
of
Diabetes Mellitus
-
A Maltese perspective**



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Coverpage: The Spiny Chicory plant [*Cichorium spinosum*] considered in
Maltese folklore as useful in the treatment of diabetes.
Drawing by V. Falzon, 1994

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The History of Diabetes Mellitus in Malta

Introduction

The history of diabetes mellitus in the Maltese Islands cannot be studied in isolation since very often, local attitudes and developments in relation to the disorder closely followed advances in pathophysiology and treatment in the main-field of medicine on the continent.

The history of diabetes has its beginnings in antiquity. This disease has apparently plagued man for a very long time. The writings from the earliest civilisations (Asia Minor, China, Egypt, and India) refer to boils and infections, excessive thirst, loss of weight, and the passing of large quantities of honey-sweet urine which often drew ants and flies. There is a reference to the diabetic condition in the *Ebers Papyrus* (dating back to 1500 BC and discovered by the Egyptologist Georg Ebers in Thebes in 1872). This recommended that those afflicted with the malady should go on a diet of beer, fruits, grains, and honey; which diet was reputed to stifle the excessive urination. Indian writings from the same era attributed the disease to overindulgence in food and drink. Other later Egyptian medical papyri [*Hearst papyrus* and *Berlin papyrus*] also give recipes against polyuria. The first known clinical description of diabetes appears to have been made by Aulus Cornelius Celsus (c.30 BC – 50 AD); but it was Aretaeus of Cappadocia (2nd century AD) who provided a detailed and accurate account and introduced the name "diabetes" from the Greek word for "siphon". Aretaeus described diabetes with the following words: "Diabetes is a dreadful affliction, not very frequent among men, being a melting down of the flesh and limbs into urine. The patients never stop making water and the flow is incessant, like the opening of aqueducts. Life is short, unpleasant and painful, thirst unquenchable, drinking excessive, and disproportionate to the large quantity of urine, for yet more urine is passed.....the patients are affected by nausea, restlessness and burning thirst, and within a short time they expire."

The treatment of diabetes in ancient days, if indeed there was one, hardly contributed to an improved quality of life. Aetius Amidinus (6th

century AD) prescribed a cooling diet, diluted wine, and cooling applications to the loins as a treatment. For latter stages he used opiates and mandragors. Paul of Aegina (c.650 AD) refined further the diagnosis of "*dypsacus*" (causing thirst), associated with the weakness of the kidneys and excess moisture from the body, leading to dehydration. He prescribed a remedy of pot-herbs, endive, lettuce, rock-fishes, juices of knotgrass, elecampane in dark coloured wine and decoctions of dates and myrtle to drink in the first stages of the disease, followed by cataplasms to the hypochondrium over the kidneys consisting of vinegar, rose oil and navel-wort. He warned against the use of diuretics, but venesection was permitted. Avicenna (960-1037 AD) prescribed emetics and sudorifics, directed that all diuretic foods and drugs be avoided and that the patients engage in exercise (preferably on horseback) to "employ moderate friction". In the latter stages, he recommended tepid baths and fragrant wine.

There is no mention in European medical literature of the existence of sugar in the urine of diabetics until the seventeenth century, when Thomas Willis (1621-1675) in Oxford, England noted the sweet taste of urine, which he suggested to come from the blood. It is noteworthy that doctors had to subsequently resort to tasting the urine of patients for sweetness in order to detect the disease. In 1766 Mathew Dobson proved that the sweet taste of diabetic urine was due to sugar. He made the crucial observation of the excess of sugar in blood.

Accounts of the diets of the middle class in northern European countries during the 15th, 16th and 17th centuries described meals consisting of many courses of roast meats dripping with fat, rich and sugary pastries, and plenty of butter and cream, but little coarse red or green leafy vegetables. Eventually, there emerged two schools of thought concerning diets. One school believed in dietary replacement of the sugar lost in the urine, while the other believed in restriction of carbohydrate so as to reduce the effects which were attributed to an excess of sugar. The first school was exemplified by the British physician Willis, who in 1675 recommended a diet limited to milk, barley water, and bread. This diet was high in carbohydrate, but low in calories. After 1797 there started a long-lasting trend towards high-fat, high-protein, and low carbohydrate diets by prescribing mainly meat and fat. None of the physicians of those times knew much about the nature of the abnormality, since various writers referred to it as a disease of the blood, kidneys, liver, or stomach. Nevertheless, some of the patients appeared to have been helped by the diets that were

prescribed, as evidenced by reductions in the amounts of sugar spilled in the urine. The restriction of the caloric intake appears to have been the most effective therapy, since the French physician Bouchardat observed that the limited availability of food in Paris during the Franco-Prussian war of 1870 to 1871 resulted in marked reduction in the sugar spilled by his diabetic patients. L. Traube (1816-1876) related that the intake of carbohydrates and its digestion increases the amount of sugar in the urine, and therefore that the stopping of the intake of the carbohydrate eliminates most of this sugar in the urine.

During the eighteenth century and early nineteenth century it became accepted that glucosuria was a diagnostic feature of diabetics and the disease was recognised as a metabolic derangement. Claude Bernard (1813-1878) theorised that diabetes was caused by glycogenolysis from the glycogen stored in the liver, which secreted sugary substances into the blood. He assumed that it was an excess of this secretion that caused diabetes. In 1877 E. Lanceraux divided diabetes mellitus into two main groups "*diabete maigre*" and "*diabete gras*". However, it was not until 1869 that the islets of cells were discovered in pancreatic tissue by Paul Langerhans (1849-1888) and were later given his name. He was never to know the significance of his discovery, as he died in 1888, one year before the key observation of von Mering (1849-1908) and Oscar Minkowski (1858-1931) that removal of the pancreas led to the development of diabetes in dogs. In 1921 Frederick Grant Banting and Charles H. Best found that insulin is secreted from the islet cells of the pancreas and obtained extracts of insulin by chemical methods of extraction. The hormone was administered to Leonard Thompson on the 11th January 1922 in the Toronto General Hospital. The earlier insulin preparations were crude and impure. The first patients had to endure injections of 5-10 ml intramuscularly. In 1936 the important biochemical differences between the insulin sensitivity in type 1 and insulin resistance in type 2 diabetes was demonstrated. The first oral hypoglycaemic was "Synthalin" produced by altering the molecule of guanidine in 1926-27. This was associated with marked side-effects, but was to eventually by modification give rise to "Phenformin" in 1957. The sulphonylureas were derived from the sulphonamides and marketed after 1955.

Diabetes Mellitus in Malta

The education of Maltese physicians during the late Medieval and Hospitaller Period was linked with that of Sicily and the European mainland. During the early Hospitaller Period in 1542, Maltese physicians were apparently closely familiar with the works of Galen (c.131-200), Rhazes (860-932), Avicenna (980-1037) and Avenzoar (1072-1162).¹ Two of these authors, Galen and Avicenna, had referred to diabetes in their medical works and undoubtedly the two Maltese physicians preparing the medico-legal report were also academically familiar with the disease. In his "*Canon*", Avicenna gives an excellent description of diabetes wherein he speaks of primary and secondary diabetes, mentions the sweetness of urine, the abnormal appetite and collapse of the sexual functions, and describes diabetic gangrene.²

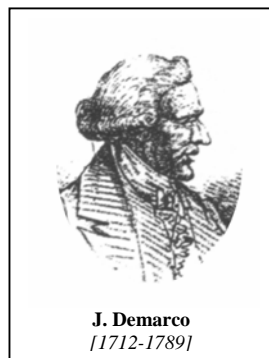


More definite evidence of possible familiarity with diabetic disorders by Maltese medical practitioners includes the presence of 17-18th century medical textbooks in the holdings of the Maltese National

¹ CEM 22, *Acta originalia 1542*, f.34-37t. In: P. Cassar: *A Medico-legal report of the sixteenth century from Malta*. Medical History, 1974, 18:p.354-359

² N.S. Papaspyros: *The history of Diabetes Mellitus*. G.T. Verlag, Stuttgart, 1964, p.7-11

The first mention of the disease by local practitioners has been documented in 1782 when Dr. Giuseppe Demarco described in his manuscript notes a case of a nun suffering from diabetes and who in the space of ninety-four days voided 3594 chamber-pots of urine. His reference to contemporary medical literature confirms that Dr. Demarco was familiar with the relevant literature.⁴



J. Demarco
[1712-1789]

Josephus Demarco b. Cospicua (Malta) 02/01/1718 d. Valletta (Malta) 13/08/1793; **Education:** Anatomical & Surgical School at *Sacra Infermeria*, Valletta (Malta), 1742 proceeded to Montpellier (France) to continue his medical studies. Laureated in 1743. **Career:** 1743 practised as a general practitioner in Senglea; in 1788 Grandmaster de Rohan-Polduc sent him to Tripoli to treat the Pasha. **Achievements:** Published a number of medical treatises. Demarco also prepared a significant number of other treatises

dealing with a wide range of topics and disease conditions that are available in manuscript form. He was invited by the Academy of Montpellier to apply for the Chair of Medicine.⁵

Further details on the medical teaching about diabetes in Malta can be gleaned from the manuscript notes of a medical student written in 1826. In these notes, the essential symptoms of diabetes - weakness, loss of weight, insatiable appetite, and frequency of micturition - are clearly described. The urine was noted to have "a sugary flavour". The attributable aetiological factors included abuse of alcoholic drinks, a

⁴ G. Demarco: *Manuscript 39*, National Malta Library, fol. 176, as reported in P. Cassar, 1982: *op. cit.* p.7

⁵ H.C.R. Vella: *Edition, translation and commentary - Joseph Demarco. On the passage of Air from the Lungs into the Blood system*. University Press, Malta, 1999, +113p.

sedentary life, melancholia and unhealthy nutrition. Treatment was mainly supportive with pharmaceutical preparations playing very little role, if any. The patient was assisted by sustaining his morale, encouraged to perform physical exercise and advised to eat an "easily digestible animal diet".⁶ The cause-specific mortality rate from the disease in 1834 amounted to about 4.9 per 100,000 population [a total of four cases annually].⁷



Development in the medical concepts in the aetiology and management of diabetes as followed by Maltese practitioners during the subsequent decades of the nineteenth century can be traced by reviewing the local medical publications. In 1838, the editor of *L'Ape Melitensis* Dr. C.G. Schinas, then Professor of Medicine at the University of Malta, reviewed a paper on the microscopic examination of urine previously published in France. The reviewer remarked that the two criteria that confirm a sure diagnosis of diabetes are the passage of a great quantity of urine with a considerable specific weight and the fermentation of sugar-containing urine. Reference was also made to the work by W. Prout "*An enquiry on the Nature and Treatment of Diabetes, Calculus and other affections of the Urinary Organs*" published in London.⁸ A contemporary physician Dr.

⁶ Giuseppe Perini: *Medicina Pratica*. Manuscript lecture notes, 1826-27 [in Dr. P. Cassar's holding], as reported in P. Cassar, 1982: *op. cit.*, p.7-8

⁷ M.R. Montgomery: *Gibraltar, Malta and the Ionian Islands*. H.G. Bohn, London, 1837, vol. VII, p.207

⁸ G.C. Schinas: *Studio microscopico della orina ecc.* *L'Ape Melitense*. September 1838, 1(1):p.29,35; 1(2):p114

Francesco Leone Gravagna presented a dissertation on diabetes on the 16th January 1840 to the *Societa` Medica d'Incoraggiamento di Malta*.⁹



The subsequent Maltese medical journal *Il Filocamo* on the 1st September 1841 published a summary of a paper previously published in a foreign medical journal about the pharmaceutical management of diabetes using pills containing iron sulphate, zinc sulphate and extract of gentian. The editor, Prof. C.G. Schinas, observed that diabetes "was an illness very often resistant to the most rational and active forms of treatment and because the essential nature of it was still unknown and, therefore, until this is determined one could not devise ways of curing it."¹⁰ In a subsequent edition, the editor published a summary of an article that had appeared in the *Edinburgh Monthly Journal of Medicine*. This paper emphasised the fact that sugar was not always found in the blood of diabetics; that it was doubtful whether diabetes was curable; and that diabetes mellitus could be mistaken for diabetes insipidus.¹¹

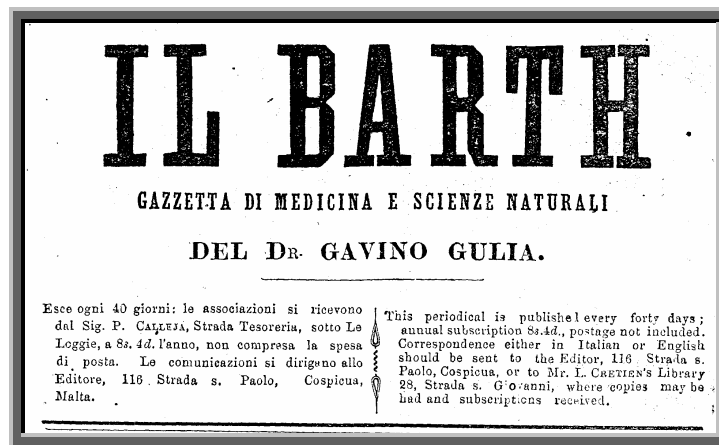
A local case of diabetes managed by the exclusion of carbohydrates from food, a prescription of a meat diet and the administration of lactic acid was described in 1872 by Dr. Carmelo Borg in the Maltese journal *Il Barth*. A favourable response to this regimen was noted after nine days with the gradual steady improvement in the clinical state as evidence by an increase in weight, disappearance of thirst, normal urine and return of sex potency. The regimen of management was based on that advocated by Professor Arnaldo Cantani of the Ospedale Clinico of the University of Naples. Dr. Borg discussed the rational of

⁹ P. Cassar, 1982: *op. cit.*, p.8

¹⁰ *Osservazioni di un caso di diabetico guarito coll'uso del ferro e dello zinco del Dr. Howard*. *Il Filocamo*, 1st September 1841, 11:p.86

¹¹ *Riflessioni sul diabete del Prof. Christison*. *Il Filocamo*, 1st November 1841, 15:p.119

the treatment regimen by discussing the pathophysiology of glucosuria. Examination of the patient's urine for glucosuria in this case was assisted through the use of Moore's reagent and the Luton and Trommer tests.¹² The association of carbuncle formation and pulmonary tuberculosis to diabetes was also noted.



The Cantani regimen was further promoted by the editor Dr. Gavino Gulia through a review of a paper that had appeared in the Italian journal *Il Morgagni*.¹³ Gulia further refers to the skim-milk regimen described by Arthur Scott Donkin in his book "*The Skim-milk treatment of Diabetes*" published in London in 1871.¹⁴ The Cantani regimen was also used successfully by Dr. P. Sammut of Gozo who described its use in two diabetics remarking that all patients with glucosuria in Gozo had previously died from the disorder. He was also aware of the association of diabetes to pulmonary tuberculosis, gangrene of the lower limbs, cataract formation and loss of vision.¹⁵

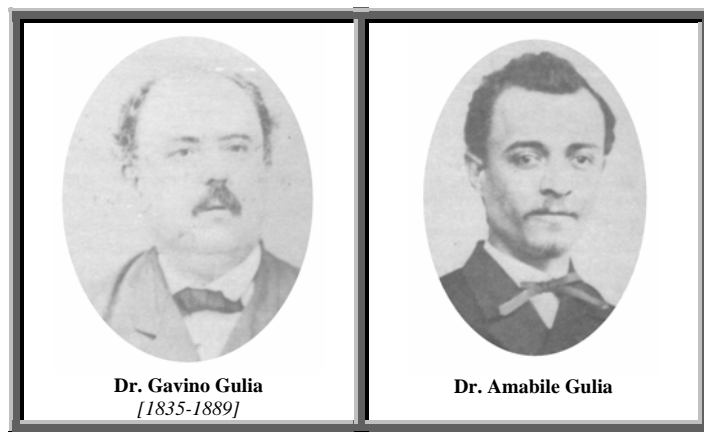
¹² C. Borg: *Sopra un caso di diabete mellito trattato coll' Acido Lattico e con dieta esclusivamente azotata*. *Il Barth*, 9th March 1872, 1(6):p.120-122

¹³ *Sul regime dietetico dei diabete esposto dal Prof. Primavera*. *Il Barth*, 10th June 1872, 1(8):p.164-166; *Considerazioni pratiche sulla cura diabetica del Cantani*. *Il Barth*, 10th June 1872, 1(8):p.166

¹⁴ *Reattivo della zucchero nell'urina*. *Il Barth*, 6th August 1872, 1(9):p.184

¹⁵ P. Sammut: *Sopra due casi di glicosuria trattati col metodo del Cantani*. *Il Barth*, 22nd July 1873, 2(15/16):p.327

Using the Cantani regimen, Dr. Gavino Gulia also described an improvement in the condition of a diabetic patient with urine having a specific gravity of 1060, weakness of vision, and frequent penile erections.¹⁶



Though his journal, Dr. Gavino Gulia furthered medical observations pertaining to diabetes. In 1872, Gulia drew attention to the "decidedly acid odour *sui generis*" in the breath of diabetics, and stressed the importance of a correct early diagnosis of diabetes by carrying out urine examinations - tests that were carried out by only a few of the Maltese doctors.¹⁷ Four years later, he referred to the observation that flies were attracted to the urine of diabetic patients, an observation that had been used by Maltese practitioners in diagnosing the disorder since a long time previously.¹⁸ Gavino's brother, Amabile, in 1873 translated into Italian an article previously published in the *Medical Times and Gazette* of the 21st June 1873. The article dealt with the glycogenic functions of the liver and its relation to glucosuria and diabetes. It further made reference to the researches of Claude Bernard and John Dalton.¹⁹

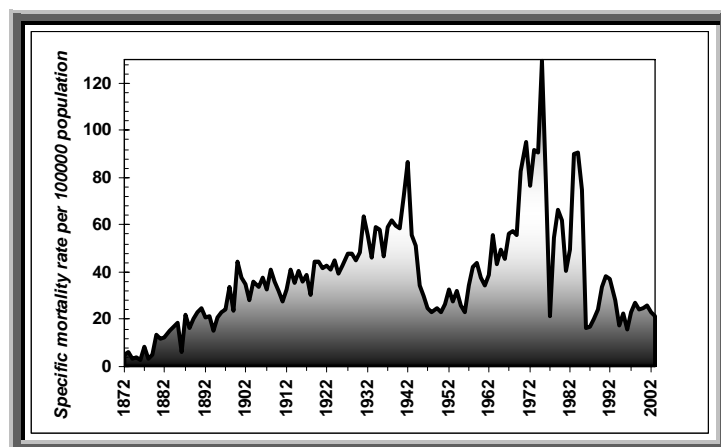
¹⁶ *Osservazione sul diabete*. Il Barth, 6th August 1874, 3(21/22):p.432

¹⁷ *Un altro sintoma del diabete*. Il Barth, 12th December 1872, 2(11):p.225

¹⁸ *Le Mosche e il diabete*. Il Barth, 6th June 1876, 4(5/6/7):p.87

¹⁹ *Sul glicogene e sulla glicogenia*. Il Barth, 22nd July 1873, 2(15/16):p.302-304

In spite of the apparent introduction and popularisation of the Cantani regimen for the management of diabetes, the cause-specific mortality rate in the late nineteenth century remained generally similar to the 4.9 per 100,000 population figure reported in the early decades of the century. In 1873, the cause-specific mortality rate was recorded at 6.3 per 100,000 population. It apparently continued to rise progressively throughout the late nineteenth and early decades of the twentieth century to reach a value of 23.7 per 100,000 population in 1899 and 58.4 in 1940 (see figure below).²⁰



Mortality rates from diabetes: 19-20th century

The reasons for this significant gradual rise in cause-specific mortality rates may be multifactorial. One proposed cause is the changes in the diet structure of the general population that occurred during this period. The diet during the early nineteenth century remained pretty

²⁰ D.O.H. *Return of deaths in Malta and Gozo*. Malta Government Gazette, 1872-1896, fortnightly reports; D.O.H. *Annual Reports on the Health Conditions of the Maltese Islands and on the work of the Medical and Health Department for the years 1896-1971*. Department of Health, Malta, 1897-1972, annual reports; C.O.S. *Demographic Review of the Maltese Islands 1960-1999*. Central Office of Statistics, Malta, 1961-2000, annual reports

much the same for the general population, particularly the lower classes. The majority of the population subsisted on large quantities of barley bread and wine, supplemented by oil, olives, onions, garlic, cheese and very little fish or meat. In season, they ate freely of melons, prickly pear, and raw vegetables. A large part of a worker's income was spent on staple commodities, particularly bread. Meat was rarely affordable and hence rarely tasted. In 1842 it was recorded that in the sister island of Gozo (total population 1842: 14,342 persons), "only one bullock was killed weekly for the market, and that was sufficient for the whole population, including a detachment of British troops who used a considerable proportion of it". By the turn of the twentieth century living conditions had improved. Thus by 1911 in Gozo (total population 1911: 23,028), the average weekly number of animals slaughtered in the Gozo abattoir amounted to 215 beasts mainly lambs, cattle, swine and goats.²¹ The dietary change from a basic subsistence diet to a richer one would have increased the predisposition to obesity and the associated insulin resistance state.

LA RIVISTA MEDICA		
Si pubblica due volte al mese.		
<p>Condizioni d'abbonamento Per Malta scellini 6 all'anno Per gli studenti scellini 4. Per l'estero aggiungansi le spese postali Abbonamento annuo pagabile per semestre in anticipo.</p>	<p style="text-align: center;">DIREZIONE</p> <p>Tutto ciò che riguarda la Redazione del periodico, deve essere diretto All'Ufficio della redazione Valletta, Sda. St' Ursola No. 211. Tipografia M. Camilleri.</p>	<p>Condizioni d'abbonamento Non si restituiscono manoscritti Gli abbonamenti che non vengono disdetti almeno quindici giorni prima della loro scadenza, si intendono rinnovati.</p>

The Cantini regimen was not the only one being promoted in Malta during the period. In 1890, the Maltese medical journal *La Rivista Medica* reviewed a paper read by Prof. Dujardin-Baumetz at the International Medical Congress held in Berlin in August. This stressed the importance of eliminating sugar, fruits, wines and other forms of alcohol from the diet of the diabetic patient while allowing 3-4 ounces of boiled potatoes to replace bread. Physical exercise was also

²¹ C. Savona-Ventura: *Mortality trends from Diabetes Mellitus in a high prevalence island population*. International Journal of Risk & Safety in Medicine, 2001, 14:p.87-93

advocated.²² Another paper by Dr. Frederick William Pavy presented at the same congress was subsequently also summarised in the Maltese journal. This paper attributed the hyperglycaemia to the inability of the liver to control the passage of sugar into the blood stream. While stressing the need for dietary restrictions, the author advocated the administration of opium, codeine and morphine to further reduce the sugar levels.²³ The subsequent year, *La Rivista Medica* reported the work of Dr. N. Casarelli, published in the *Rivista generale italiana di Clinica medica*, with the use of sulfonal in diabetes mellitus. The drug was shown to exert a favourable influence on diabetes, decreasing glucosuria, polyuria and polydipsia.²⁴

Non-medical individuals also furthered popular knowledge about the disease in the local press. The editor of the newspaper *La Voce del Popolo* Francesco Saverio De Cesare, who suffered from diabetes, published in 1893 an editorial wherein he detailed the symptomatology and progress of his disease. While in Paris, he had been introduced to a medication known as *China anti-diabetica*, which consisted of a tonic element (cinchona) and an anti-diabetic basis (redistilled glycerine of great purity). De Cesare claimed to have been treated by this agent in conjunction with total abstinence from sugar-containing food and physical exercise. He undertook to introduce the medication to Malta by publishing a translated brochure about the medication, by undertaking to import the product for sale in local pharmacies, and encourage local doctors including Dr. Ernesto Marmara and Dr. Hamilton Stilon to use the medication on their diabetic patients. The efficacy of the treatment was extolled through repeated advertisements. De Cesare also advertised the importation and sale of chocolate, flour, pasta, and gluten semolina for diabetics.²⁵

²² F.B. [F. Borg]: *Congresso Internazionale Medico di Berlino: Cura del diabete mellito*. *La Rivista Medica*, 30th August 1890, 1(12):p.2-3

²³ *Congresso Internazionale Medico di Berlino. Sezione di Terapia Medica - Ancora del Diabete mellito*. *La Rivista Medica*, 15th September 1890, 1(13):p.4-5

²⁴ *Rivista - Nuove Medicazioni - Sulfonal*. *La Rivista Medica*, 15th October 1891, II(15):p.3

²⁵ *La Voce del Popolo*, 19th September 1893, 1(32):p.3; *Rimedio Eroico ed Infallibile contro la diabetie*. *La Voce del Popolo*, 24th October 1893, 1(42):p.4; *Glicerina Rocher*. *La Voce del Popolo*, 28th November 1893, 1(51):p.4; *China Anti-diabetica Rocher*. *La Voce del Popolo*, 19th December 1893, 1(57):p.4; *China Anti-dibetica Rogher*. *Risorgimento*, 31st July 1894, 5379:p.4; *La Vera China Anti Diabetica Rocher*. *Risorgimento*, 4th August 1894, 5383:p.1

Dr. Paul Agius in 1897-98 was also recommending lemonade consisting of a mixture of 5 parts citric acid, 20-30 parts glycerine in 1000 parts water; and also the careful controlled use of saccharine as a sweetening agent.²⁶ The pharmacist Francesco Caruana Dingli in 1899 manufactured an anti-diabetic medication *Nuovo Liquore Anti-diabetico* claimed to be "an infallible and very quick acting remedy against diabetes even in its most resistant form". This had been examined and approved by Prof. V. Micallef, Professor of Chemistry and Government Analyst.²⁷ In the first decade of the twentieth century, another locally prepared anti-diabetic agent *Fermentina* was being marketed.²⁸

ID-DIABETE
Hi marda li jecce tilkaghla m'il euuel tista tfiek minnha f'kasir zmien, izda li jecce thalliha tidhol il geuua seuaa bla ma ticcuraha tista anche tibaghtec id-dinja l-ohra. Ilhom snin cbar jithabtu biex ijsibu rimedju seuaa li jfejjakha f'kasir zmien u ghal collox u fl-ahhar irnexxeu billu sabu il
FERMENTIN
li scond ma jghidu l-ahjar Professuri ta' d-dinja ghal d'il marda hadd ma jaghibu. Ippruvauh mela m'il actar fis!

In-Nahla 9th July 1910

Local medical folklore similarly attributed several plants and their extracts as useful for the management of diabetic disorders (see table below). The most popularly used plant appears to have been the Spiny chicory *Cichorium spinosum*. This was boiled and the effusion was then drunk. Alternatively the leaves were eaten. Another commonly used plant was the Lemon verbena *Lippia citriodora*.²⁹ The Professor of Botany J. Borg in 1927 was recommending the use of fenugreek

²⁶ La Salute Publica, 10th September 1897, 1(11):p.4; *Pei Diabetici*. La Salute Publica, 25th July 1898, 2(31):p.3

²⁷ *Avviso ai diabetici*. La Gazzetta di Malta, 1st July 1899, 1899:p.4; 30th January 1900, 4873:p.4

²⁸ In-Nahla, 7th October 1909, p.4; 9th July 1910, p.671

²⁹ G. Lanfranco: *Hxejjex Medicinali u ohrajn fil-Gzejjer Maltin*. Media Centre Publications, Malta, 1993; G. Lanfranco: *Medicina popolari ta' l-Imghoddi fil-Gzejjer Maltin*. Klabb Kotba Maltin, Malta, 2001, p.57

[*Trigonella foenum-graecum* Linn.], now proven to have antidiabetic properties, in the management of diabetes.³⁰

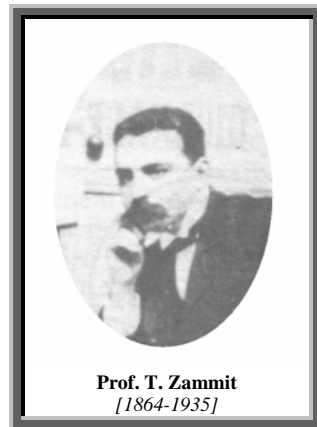
Scientific Name	English Vernacular
❖ <i>Urtica sp.</i>	Nettle, Stinging nettle
❖ <i>Trigonella foenum graecum</i>	Fenugreek, Greek hayseed
❖ <i>Arachis hypogaea</i>	Groundnut
❖ <i>Phaseolus vulgaris</i>	Bean, French Bean, Kidney Bean, Garden Bean, etc
❖ <i>Eucalyptus amygdalinus</i>	Narrow-leaved eucalyptus, Fever tree
❖ <i>Olea europea</i>	Olive
❖ <i>Verbena officinalis</i>	Vervain
❖ <i>Lippia citriodora</i>	Lemon verbena
❖ <i>Helianthus tuberosus</i>	Jerusalem artichoke
❖ <i>Cynara scolymus</i>	Globe artichoke
❖ <i>Cichorium intybus</i>	Chicory
❖ <i>Cichorium spinosum</i>	Spiny chicory
❖ <i>Smilax aspera</i>	Italian smilax, Sarsaparilla
❖ <i>Zea mays</i>	Maize, Indian corn

Plants believed for diabetes in Maltese Medical Folklore



³⁰ J. Borg: *Descriptive Flora of the Maltese Islands including the ferns and flowering plants*. Government Printing Office, Malta, 1927, p.,349

On the academic side, Maltese medical practitioners were kept abreast with the research progress on the continent. In 1891, the medical journal *La Rivista Medica* highlighted the proposed classification of the disease made by Dr. Duhome of the Therapeutical Society of Paris who subdivided the disease in three gradations based on the rapidity with which glycosuria disappears.³¹ The journal also familiarised medical practitioners with the work of Oscar Minkowski and Joseph von Mering who by removing the pancreas of dogs induced a diabetic disorder thus linking the disease with pancreatic dysfunction.³² Dr. Themistocles Zammit summarised a lecture given by Prof. George Dieulafoy in Paris in 1891. The lecture drew attention to the lesser known early presenting features of the disease such as bleeding gums, blurring of vision, phimosis and balanitis.³³

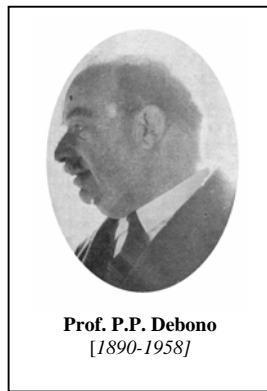


³¹ T.Z. [T. Zammit]: *Regime alimentare nella glicosuria*. *La Rivista Medica*, 15th March 1891, 2(1):p.5-6

³² *Medicina Pratica: Dott. Minowski - Diabete Mellito e effezione del pancreas*. *La Rivista Medica*, 30th April 1891, 2(4):p.2-5

³³ T.Z. [T. Zammit]: *Il Diabete Mellito*. *La Rivista Medica*, 31st January 1892, 2(22):p.2-3

In spite of the scientific advances and dietary regimens made and proposed during the nineteenth century, the real breakthrough in the treatment of diabetes was made by the extraction of insulin from the pancreas and its successful use in a diabetic patient in January 1922.³⁴ This landmark discovery was quickly brought to the attention of the Maltese medical profession and in June 1923 Dr. Peter Paul Debono reviewed the use of insulin finding it useful in cases of diabetic coma, the juvenile form of diabetes, diabetics with infections or undergoing surgery, and in those cases who could not be kept on a sugar-free diet. Because of the high cost associated with the medication and its control, Insulin therapy was still restricted to those who could afford to buy the medication or were in-patients in the hospital.³⁵



Peter Paul Debono b. 29/06/1890 d. 03/06/1958. Education: Lyceum; University of Malta qualifying PhC 1906 and MD 1910. Continued surgical studies in the United Kingdom obtaining a DPH and FRCS. Career: joined government health services eventually being appointed Senior Surgeon and Professor of Surgery 1926; retired 1951. Achievements: served as Minister of Health with Labour Administration 1947-1950 and Speaker of the Legislative assembly 1948-1950. Awarded the Order of the British Empire 1940.³⁶

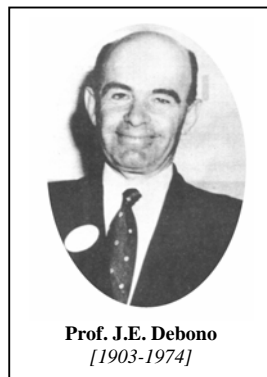
Increasing clinical interest in diabetes and its management appears to have increased in the subsequent years. Nineteenth century Maltese medical literature dealt mainly with management options, and does not appear to reflect any particular concern to a high prevalence of the disease. The first documentation relating to a high frequency of diabetes in the Maltese population was made by the Professor of Medicine in 1927. Prof. J.E. Debono noted that, while he had not formally assessed the incidence of the disease in the Maltese population, he had observed that diabetes was "extraordinarily

³⁴ N.S. Papaspyros, 1964: *op. cit.*, p.80

³⁵ P.P. Debono: *Insulin*. La Rivista Medica, 1923, I(3):p.58-60

³⁶ C. Savona-Ventura: *Debono, Pietru Pawl*. In: *Maltese Biographies of the twentieth century* (eds. Schiavone M.J., Scerri L.J.). PIN, Malta, 1997, p.212

common" and appeared to be linked to obesity. The booklet is dedicated to the approximately 10,000 known diabetics, thus suggesting an estimated prevalence of known diabetic patients of about 4.5%.³⁷ The cause-specific mortality rate during 1927 amounted to about 47.7 per 100,000 population.³⁸



Prof. J.E. Debono
[1903-1974]

Joseph Edward Debono b. Valletta 01/05/1903 d. 18/08/1974. *Education:* Lyceum; Royal University of Malta qualifying BSc 1921 and MD 1925; continued postgraduate studies in the United Kingdom qualifying MRCS LRCP 1926 and MRCP 1935. Elected FRCP 1948. *Career:* appointed Professor of pharmacology, materia medica and therapeutics at Royal University of Malta 1936 and eventually Professor of Medicine 1946, retired 1963. *Achievements:*

published a number of publications in the field of his medical speciality. Made Commander of the Order of the British Empire 1956.³⁹

Prof. J.E. Debono outlined the principles of diabetic management with the mainstay of treatment remaining a maintenance-diet that contains just enough calories to maintain life and health. Insulin by injection was added to the management if glucosuria persisted after a week of dietary control. There appeared to be a local prejudice against the use of insulin with a deplorable tendency to have recourse to inefficient substitutes. While initially prescribed and managed by the physician, there was no reason why patients could not inject themselves after preliminary instruction. All insulin substitutes available at the time were "absolutely valueless". However synthalin, developed by the drug company Schering and then still under investigation, was

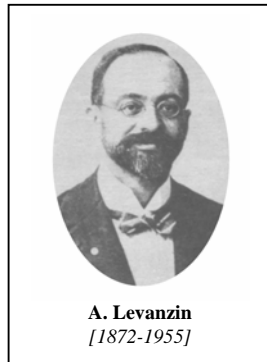
³⁷ J.E. Debono: *What every diabetic should know*. Malta, 1927

³⁸ D.O.H., 1897-1972: *op. cit.*

³⁹ C. Savona-Ventura: *Debono, Joseph Edward*. In: *Maltese Biographies of the twentieth century* (eds. Schiavone M.J., Scerri L.J.). PIN, Malta, 1997, p.211

mentioned as a possible substitute to insulin in mild cases in spite of its toxic effects.⁴⁰

Prof. J.E. Debono's work on diabetes was criticised by the editor of the newspaper *In-Nahla*. In response to Debono's publication, the editor Agostino Levanzin published during 1928 a series of articles on diabetes wherein he differentiated between true diabetes and glucosuria emphasising their different prognosis.⁴¹ Levanzin had maintained a very active interest in medical matters and was a very strong proponent of the 40-day dietary regimen for health. In 1911, he had propagated the dietary regimen by a serial and a booklet entitled *Il Cura ta' s-Sawm* based on the articles written by Upton Sinclair in the February-March 1911 issues of the *London Magazine*.⁴² His interest in dietary measures stimulated his activities after his emigration to America in 1912. There he underwent a fast of 31 days for the purpose of assisting physiological studies and lectured on total fasting and gave a personal demonstration under strict medical supervision.⁴³



Agostino Levanzi b. Senglea (Malta) 23/05/1872 d. Montecarlo 16/03/1955. *Education:* Seminary; joined University of Malta to read medicine qualifying BA and obtaining a diploma of Pharmacy; then joined course of laws qualifying as a solicitor. *Career:* first employed as an apprentice at the R.N. Dockyard eventually promoted to a clerk; eventually became a journalist and newspaper editor. *Achievements:* was a staunch defender of the workers; during his period of emigration to America

undertook physiological studies in fasting.

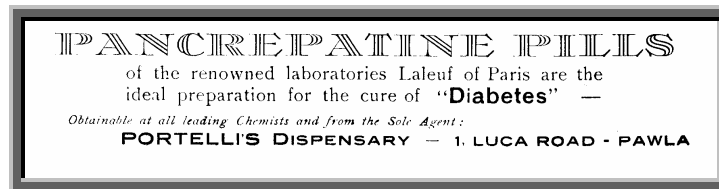
⁴⁰ J.E. Debono, 1927: *op. cit.*, p.10-15

⁴¹ *X'Inu id-Diabete?* In-Nahla, n.d. (1928) 188:p.1-3; 190:p.1-2; 191:p.4; 192:p.2-3

⁴² *Il Cura ta' s-Sawm*. In-Nahla (18.03.1911-17.02.1912) nos.133-179; A. Levanzin: *Il-Cura ta' s-Sawm*. Malta, 1911 [as reported in *In-Nahla*]

⁴³ M.J. Schiavone: *Levanzin, Agostino*. In: *Maltese Biographies of the twentieth century* (eds. Schiavone M.J., Scerri L.J.). PIN, Malta, 1997, p.366-367.

In spite of the introduction of insulin in Malta by 1923, it appears that very little progress was made in controlling the mortality from diabetes. The cause-specific mortality rate continued to increase progressively from 41.8 per 100,000 population in 1921 to 61.8 in 1938 (see figure above).⁴⁴ To better manage patients with diabetes, Prof. J.E. Debono in 1939 set up the first Diabetic Clinic at the government-run hospital in Malta with an average weekly attendance of about 45 patients. Patients were initially admitted to hospital and their condition controlled with a standard diet and the use of Protamine Insulin administered by injection as a single daily dose. The results of this management regimen were described as "very good".⁴⁵ In 1939, Portelli's Dispensary of Paola, as sole agent, was advertising the sale of Pancreatine Pills of the renowned laboratories Laleuf of Paris as the ideal preparation for the cure of diabetes.⁴⁶



The efforts made by the medical professions were quickly offset by the social disruption brought on by the onset of hostilities of the Second World War. The effects of the siege conditions and their aftermath can be seen from the cause-specific mortality rates for the period. The initial response to the blockade was an apparent increase in mortality from diabetes to reach a peak of 86.6 per 100,000 population in 1942. This sudden surge in mortality was possibly a result of difficulties to maintain adequate clinical management of the more severe diabetic cases. The immediate post-war years were attendant by an apparent fall in mortality to reach the 23.0 per 100,000 population level in 1948. This fall may have been partly a result of the previously high selective mortality pattern. It may also have been

⁴⁴ D.O.H., 1897-1972: *op. cit.*

⁴⁵ J.E. Debono: In: *Annual Report on the Health Conditions of the Maltese Islands and on the work of the Medical and Health Department for the years 1938*. Malta Government Gazette Supplement cliv:p.31, 29th December 1938

⁴⁶ *Lyceum Magazine*, January 1939, I(8):p.18

contributed to by subsequent better control of surviving diabetic cases following the period of dietary restrictions during the war years.⁴⁷

The post-war period was attendant by the resumption in improvement of the social conditions of the Maltese population. In the 1950s, Maltese cooking was described as "sub-Italian, monotonous and drab". It included a high amount of starch and fats that adversely affected the figures of the majority of the Maltese by their mid-twenties. British-style food, such as fried eggs, bacon and chips had also made an inroad in the Maltese diet.⁴⁸ With the improvement of the socio-economic status of the population after the post-war years, the specific mortality rate from diabetes saw a marked rise reaching a peak of 129.2 per 100,000 population in 1975,⁴⁹ this in spite of the increasing availability of oral hypoglycaemic agents on the market. The observed rise may also in part be attributed to the pronounced emigration drive that occurred during the 1960s with younger members of the population emigrating overseas thus offsetting the population denominator.⁵⁰

The increasing mortality noted in the 1950s rekindled the concern of the physicians and public health officials towards diabetes-related problems. In the departmental health reports of 1952-59, the Chief Government Medical Officer - Prof. Joseph Galea - voiced his concerns about the increasing problem of obesity and diabetic disorders. In 1959, he commented that the true prevalence of the disease was still unknown and that many did not know they suffered from the disease until some complication had set in. It appears that the management regimen of known diabetics had decreased the incidence of diabetic coma as a complication.⁵¹ Diagnostic criteria using an oral glucose tolerance test had been introduced in Malta by 1959.⁵² Prof. Walter Ganado in 1963 identified that the major problem appeared to

⁴⁷ D.O.H., 1897-1972: *op. cit.*; C. Savona-Ventura, 2001: *op. cit.*

⁴⁸ C. Savona-Ventura, 2001: *op. cit.*

⁴⁹ D.O.H., 1897-1972: *op. cit.*; C.O.S. *Demographic Review of the Maltese Islands 1960-1999*. Central Office of Statistics, Malta, 1961-2000, annual reports; C. Savona-Ventura, 2001: *op. cit.*

⁵⁰ M. Bailey, M. Zarb, C. Savona-Ventura: *Worldwide and local epidemiology of diabetes mellitus*. Chestpiece, 1979, 5(1):p.7-15

⁵¹ J. Galea: *Annual Report on the Health Conditions of the Maltese Islands and on the work of the Medical and Health Department for the years 1952-63*. Government Printing Office, Malta, 1954-1963

⁵² J.L. Grech: *The oral glucose tolerance test*. Chestpiece, 1959, 2(2):p.7-14

be maturity-onset disease since he had encountered only eight diabetics aged less than 20 years in his practice over the period 1948-1961. The number of diabetics aged more than 40 years were "legion". The prevalence of the disease in an old peoples home with 93 inmates aged >60 years was estimated at 17.2%.⁵³

PRODUCT	JOURNAL	AGENT
❖ Insulins		
"Insulins" [Boots]	CP, 1965	Kemimport
Actrapid [Novo]	SLHG, 1966	C. de Giorgio Ltd.
Rapitard [Novo]	SLHG, 1966	C. de Giorgio Ltd.
❖ Oral hypoglycaemics		
Dimelor [Lilly]	SLHG, 1966	
Diabinese [Pfizer]	CP, 1963	G. Borg-Barthet
Lycanol [Bayer]	SLHG, 1966	
Artosin [Boehringer & Soehne]	CP, 1963	Vivian Commercial Co. Ltd.
Nadisan [Boehringer & Soehne]	CP, 1963	Vivian Commercial Co. Ltd.
Diabewas [Wassermann]	CP, 1965	
Bidiabe [Laboratorio Guidotti]	SLHG, 1968	Cherubino
Tolbet [Novo]	SLHG, 1969	C. de Giorgio Ltd.
Euglucon [Boehringer & Soehne]	CP, 1970	Vivian Commercial Co. Ltd.
Daonil [Hoehst]	CP, 1970	Mercurius Trading Agency
❖ Investigative aids		
Tes-Tape [Eli Lilly]	CP, 1963	
Dextrostix [Ames Co.]	SLHG, 1966	Louis Vella Ltd.
BM test Nitrite [Boehringer]	SLHG, 1968	Vivian Commercial Co. Ltd.
Labstix [Ames Co.]	SLHG, 1968	Louis Vella Ltd.
Clinitest [Ames Co.]	CP, 1969	Louis Vella Ltd.

Diabetic Advertisements in local medical press: 1950-70⁵⁴

⁵³ W. Ganado: *Diabetes Mellitus in the Maltese Islands*. Chestpiece, Summer 1963, p.7-8

⁵⁴ CP: *Chest-piece* - first issued in October 1948 [lapsed publication 1959-63]; SLHG: *St. Luke's Hospital Gazette* - first issued in June 1966

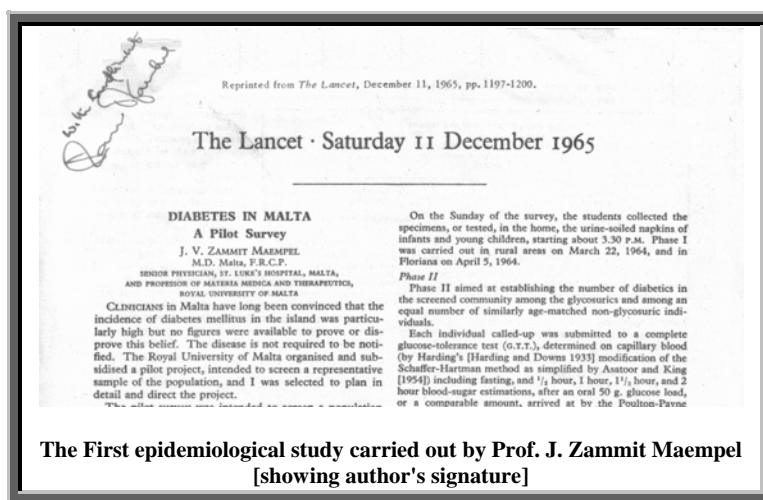
After 1955, a number of oral hypoglycaemic agents were identified and marketed. These were quickly introduced in Malta as evidenced by advertisements in the local medical press of the period [see table above].

The management of the diabetic patient was generally left to the care of the general practitioner, the only specialist free-service clinic being that offered by the Department of Medicine at St. Luke's Hospital. In 1961, the problem of diabetes was discussed at a meeting of the Society of St. Anne for the Aged and a resolution was passed identifying diabetes as "the national disease of Malta and should be tackled vigorously". The resolution further called for the setting up of a Diabetes Clinic. This resolution was forwarded to the government authorities who passed it on to Professor J.E. Debono for his consideration. Prof. Debono agreed wholeheartedly with the suggestion believing that a Diabetic Clinic would prevent or postpone diabetic complications.⁵⁵ The clinic was set up on the 20th February 1963. Two eight-bedded wards were made available for the management of diabetic patient requiring hospital treatment. In the first year of its existence, the clinic dealt with 612 cases.⁵⁶ The preoccupations raised in the late 1950s and early 1960s about diabetes and its import on the health of the Maltese population promoted the initiation of a formal epidemiological study in 1964 carried out by Prof. J. Zammit Maempel.⁵⁷

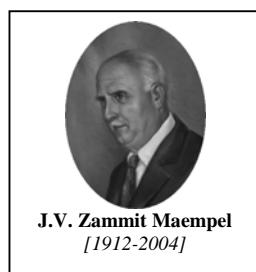
⁵⁵ P. Cassar, 1982: *op. cit.*, p.20-22

⁵⁶ *Annual Report on the Health Conditions of the Maltese Islands and on the work of the Medical and Health Department for the years 1963*. Government Printing Office, Malta, 1969, I:p.5; II:p.103

⁵⁷ J.V. Zammit-Maempel: *Diabetes in Malta: A Pilot Study*. *Lancet*, ii:1976-1200, 1965; i:205-206, 1966



The epidemiological study conducted on 5757 individuals, based on the 50-gram oral glucose load and a diagnostic 2-hour value of 120 mg/dl, identified that 17.2% of the population were diabetic. The prevailing form of diabetes was shown to be maturity onset or non-insulin dependent diabetes in the peak ages of 50-54 years; the juvenile form being uncommon. The disease was commoner in females having a male:female ratio of 1:1.6; 60% of diabetics were obese; and 51% had arterial complications. Prof. Zammit Maempel subsequently carried out further research on diabetes in Malta particularly in relation to cardiovascular complications.⁵⁸



Joseph V. Zammit Maempel b. Naxxar (Malta) 24/09/1912 d. (Sliema) Malta 17/04/2001 *Education:* Lyceum; Royal University of Malta qualifying PhC 1933 and MD 1937; continued postgraduate studies in medicine in the United Kingdom qualifying MRCP 1946; elected FRCP 1965. *Career:* joined the Medical & Health government services and the academic

⁵⁸ J. Zammit Maempel: *Collected papers on diabetes in Malta and its cardiovascular complications and some other cardiological topics.* University Publication, Malta, 1979

body of the Faculty of Medicine & Surgery eventually becoming Professor and Clinical Head of Medicine 1967; retired 1973. *Achievements*: served in various posts on the government medical and university boards. Published a large number of significant medical publications. Nominated knight of the Military and Hospitaller Order of St. Lazarus of Jerusalem 1966 and eventually knight commander 1979.⁵⁹

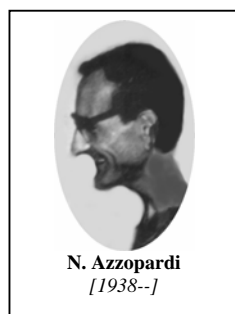
In the subsequent years, efforts were made to establish an organised system of community care for diabetics. On the 22nd March 1967, the Sovereign Military Order of St. John of Malta promised to assist the Department of Health financially in this endeavour. In 1968, the SMOM together with the Department of Health set up a Diabetic Clinic at the Mosta Civic Centre providing this with a laboratory. The SMOM was also to provide training facilities for interested Maltese doctors at its antidiabetic centre in Rome. The project was to be managed by a joint Government-SMOM administrative committee under the chairmanship of the CGMO; while the clinical management was under the responsibility of Prof. J.E. Debono assisted by Dr. Nazzareno Azzopardi. By mid-1969, 35 patients were regularly availing themselves of the Clinic's services. The District Medical Officers and Health Visitors provided free treatment to home-bound patients. Another Diabetic Clinic was established at Paola in January 1974.⁶⁰ The negative attitude towards diabetes and its treatment in the 1960s is reflected by the driving restrictions placed on sufferers. In 1966-69, the Chief Government Medical Officer commented that "It is universally accepted that no applicant under treatment with insulin is allowed to drive a public-service vehicle, even though the evidence incriminating hypoglycaemic attacks as a cause of road traffic accidents is scanty indeed".⁶¹

⁵⁹ G. Lanfranco: *Zammit Maempel, Joseph Victor*. In: *Maltese Biographies of the twentieth century* (eds. Schiavone M.J., Scerri L.J.). PIN, Malta, 1997, p.592-593

⁶⁰ N. Azzopardi: *Considerazioni sui primi cento casi osservati presso la clinica diabetologica di Mosta*. Minerva Medica, 1973, 64:p.12; *Opening of Antidiabetic Clinics*. Times of Malta, 29th March 1968, 10123:p.2,4; *Antidiabetic Clinic opened at Mosta*. Times of Malta, 4th April 1968, 10128:p.9; *Diabetic Clinics*. Times of Malta, 19th June 1969, 10502:p.7; *Diabetic Clinics*. Times of Malta, 5th January 1974, 11913:p.11; *Paola Clinic for Diabetics*. Times of Malta, 8th January 1974, 11915:p.11

⁶¹ Occupational Health Unit: *Medical Standards of Fitness for driving in Malta*. In: *Annual Report on the Health Conditions of the Maltese Islands and*

The subject of diabetes as a public health disease was included in the deliberations of the Hospitaller Committee appointed by the Grand Magisterial Council of the Military and Hospitaller Order of Saint Lazarus of Jerusalem held in Malta in October 1969 under the chairmanship of Prof. J.V. Zammit-Maempel. Other members to this committee included Dr. P.J.J. Wren, Prof. A.P. Camilleri, Mr. R.S. Morris, and Mr. A.C. Bartter. The Hospitaller Committee remarked on the increasing prevalence of diabetes mellitus and proposed the institution of dedicated clinics or non-profit hospital services, the distribution of free drugs, the development of domiciliary services, and the institution of research funds.⁶²



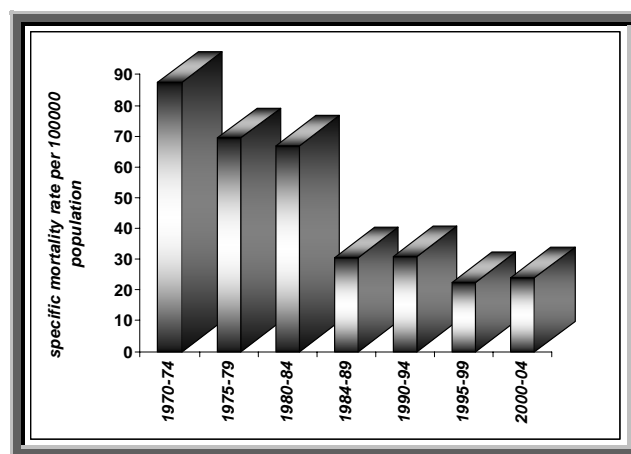
Nazzareno Azzopardi b. Lija 02/02/1938. *Education:* Lyceum; Royal University of Malta qualifying MD 1961; continued postgraduate training in anaesthesia in the United Kingdom qualifying DA 1965; elected Fellow of the Faculty of Anaesthesia of the RCS 1975. *Career:* entered government service eventually being appointed consultant anaesthetist 1976; also served as lecturer with the University; retired 1999. *Achievements:* has published a number

of medical publications; was the founding president of the Malta Association of Anaesthetists.⁶³

on the work of the Medical and Health Department for the years 1965-1966, 1967. Government Printing Office, Malta, 1969, p.103; A. Grech: *Medical standards of fitness for driving in Malta.* St. Luke's Hospital Gazette, 1969, 4(1):p.32

⁶² J.V. Zammit-Maempel: *Hospitaller Committee.* In: *Report of the Grand Magistral Council held in Malta 3rd to 5th October 1969.* MHOSLJ, Malta, 1969, p.20-22

⁶³ C. Savona-Ventura: *Azzopardi, Nazzareno.* In: *Maltese Biographies of the twentieth century* (eds. Schiavone M.J., Scerri L.J.). PIN, Malta, 1997, p.43-44



Mortality rates from diabetes: 1970-2004 period

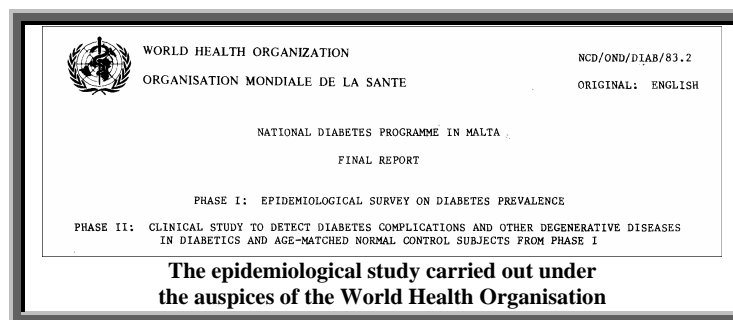
The active efforts, increased facilities, and newer modalities of treatment enabled a drop in the cause-specific mortality rates. The late 1970s and 1980s rates showed a very variable annual fluctuation probably reflecting changing registration practices following the influx of foreign-trained doctors in government hospitals after the 1977 Doctors' Industrial Dispute. The overall pattern in these last two decades appears to have been a gradual fall in cause-specific mortality rates reflecting in part better management options and better defined registration practices.⁶⁴

Diabetes mellitus remained in the 1970s the third most important cause of death after vascular disease and cancer. This preoccupation was addressed by the Minister of Health of Malta in the 23rd and 24th Sessions of the European Regional WHO Conference in 1973 and 1974, wherein a request was made to the WHO to support a formal population study.⁶⁵ In 1980, the WHO undertook the projected study - the National Diabetes Programme - through the collaboration of the Institute of Diabetes, Endocrinology and Metabolic disease at Zagreb University (Yugoslavia) and the Catholic University of Louvain (Belgium). The first phase of the study launched on the 9th January

⁶⁴ C.O.S., 1961-2000: *op. cit.* C. Savona-Ventura, 2001: *op. cit.*

⁶⁵ *Health Minister addresses WHO Conference in Vienna.* Times of Malta, 18th September 1973, 11821:p.20; *Dr. Piscopo calls for WHO assistance in health project.* Times of Malta, 13th September 1974, 12127:p.16

1981 consisted of a comprehensive survey among 1100 households to gather data about diagnosed and undiagnosed diabetes. The second phase of the study scheduled for May 1981 set out to identify the risk of diabetic complications and other degenerative disease in diabetic subjects. The results of this epidemiological study were eventually published by the WHO in 1983.⁶⁶ Longitudinal follow-up of the studied subjects was carried out over a six-year period - Phase III conducted in 1983, Phase IV in 1985, and Phase V in 1987.⁶⁷



The National Diabetes Programme identified an overall prevalence of diabetes in individuals aged >15 years of 7.7% while impaired glucose tolerance accounted for a further 5.6% of the population. The rates were higher in females and increased with age.⁶⁸ Other epidemiological studies identified the prevalence of Type I diabetes or insulin dependent diabetes as being 81.2 per 100,000 population aged 0-14 years. The prevalence in subjects aged <20 years was 117 per 100,000 population.⁶⁹ The prevalence of known diabetics in the 1981 study was reported as 5.9%; the estimated figure for 1992 was

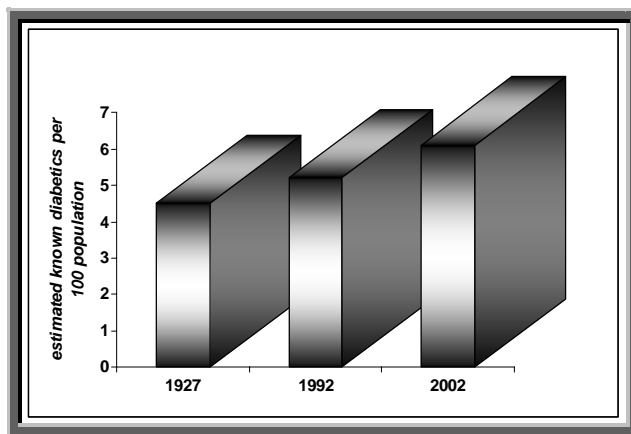
⁶⁶ Katona G.; Aganovic I., Vuskan V., Skrabalo Z.: *The National Diabetes Programme in Malta - Final report Phases I & II*. WHO.NCD/OND/DIAB/83.2. Geneva, WHO, +115p., 1983

⁶⁷ J. Tuomilehto: *National Diabetes Programme. Malta Phase III*. In: *Health Services Development Plan 1986-90*. Government Press, Malta, 1986, p.109-156; A.G. Schranz: *Abnormal glucose tolerance in the Maltese. A population-based longitudinal study of the natural history of NIDDM and IT in Malta*. Diabetes Research and Clinical Practice, 1989, 7:p.7-16

⁶⁸ G. Katona et al., 1983: *op. cit.*

⁶⁹ A.G. Schranz, V. Prikatsky: *Type I diabetes in the Maltese Islands*. Diabetic Medicine, 1989, 6:p.228-231

reported as 5.2%; in 2002 the figure was about 6.1%.⁷⁰ The figures suggest that the prevalence of diagnosed diabetics has been progressively increasing during the 20th century (see figure below) even though the cause-specific mortality has decreased. The reasons for this apparent increase may be due to better awareness and recourse for diagnosis by the patients themselves and also on the better registration techniques utilised by the Diabetic Clinic at St. Luke's Hospital. Various other clinical and epidemiological studies have since been undertaken enabling a better understanding of the epidemiology and clinical course of the disease in the Maltese population.



Prevalence of estimated known diabetic cases



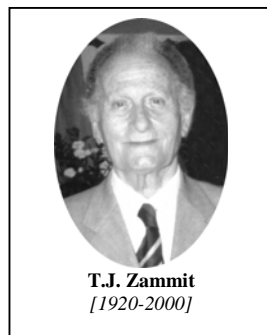
In 1981, a self-help philanthropic group to act as an advisory body to safeguard the social and economic interests of diabetic patients. - the Maltese Diabetes Association - was set up through the efforts of Tancred Zammit and Dr. Antoine Schranz. The Association promotes the study of the causes and treatment of diabetes and the diffusion of information among all those concerned

⁷⁰ G. Katona et al., 1983: *op. cit.*, Table 9; WHO: *Health Services Indicators - Diabetes Prevalence*. WHO Regional Office for Europe, Copenhagen, 2001

with the care of the diabetic persons. Since 1983, it has published its own quarterly magazine *Id-Dijabete u Sahhitek* that is distributed free to all its members. In addition it has published a number of other educational booklets and leaflets, and regularly holds lectures, discussions and socials for the benefit of the community. It has been a full member of the International Diabetes Federation since 1982.



Early Council meeting of the Maltese Diabetes Association

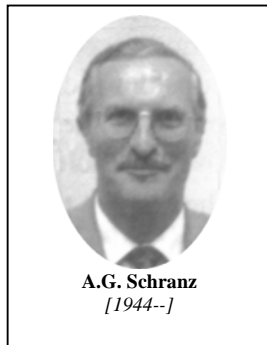


Tancred J. Zammit b. Sliema (Malta) 27/09/1920, d. Santa Venera (Malta) 2000. Married to Lina Simler, two children - Edward John and Marie Louise. *Education:* St. Albert's Central School 1933-38, Awarded Teacher's Certificate from London University 1948. *Career:* joined Education Department in 1938 as teacher and after 1948 appointed Head Teacher. *Achievements:* World War II served in R.A.F. 1941-44 and awarded campaign medals. In 1981 set up the

Maltese Diabetes Association.⁷¹

⁷¹ *Malta Who's Who 1965*. Progress Press, Malta 1965, p.258

Antoine G. Schranz b. Malta 26/12/1944. *Education:* University of Malta qualified MD 1970, University of Zagreb qualifying MSc 1986 and DSc 1988. *Career:* joined Medical & Health Department in 1970



being eventually appointed Consultant Diabetologist. *Achievements:* has published a significant number of publications on Diabetes particularly in the field of Maltese epidemiology. In 1981 was instrumental in setting up the Maltese Diabetes Association.

Since the 1980s, under the directorship of Prof. J. Azzopardi, Malta has actively collaborated with the World Health Organisation projects on diabetes participating in the implementation of

WHO-IDF European programme of the St Vincent's Declaration, the WHO Euro DIABCARE project, the diabetes data monitoring project and in therapeutic patient education for people with diabetes. In addition under the direction of Dr. C. Savona-Ventura, collaboration was initiated in 1998 with the WHO-OBSQID DPAD database project for diabetic pregnancies.

Diabetic Complications

It is now generally accepted that diabetes mellitus, particularly NIDDM, can be an insidious disorder that causes multiple organ disease. Much of this disease is related to the deterioration in the microcirculation, problems that are generally difficult to relate directly to diabetes. However certain conditions, throughout the years have been identified to have a particular relationship to diabetes.



Carbuncles [Latin for charcoal] are an infective gangrene of the subcutaneous tissue due to staphylococcal infection often occurring in the nape of the neck. The usual sufferers were males above forty years of age. The subcutaneous tissues became indurated and inflamed, and after a

few days the skin broke down with sloughing and discharge of thick pus. This appearance stimulating glowing charcoal prompted the name.

The problem with attempting to follow the history of carbuncles in Malta is the fact that the term used for the condition was often referred to as *Anthraxe* making it difficult to distinguish from cases of cutaneous Anthrax infection.⁷² The term Anthrax is similarly the Greek for charcoal. The Maltese term for carbuncle or anthrax was *tracna*.

First mention of the disease in Malta was made by Dr. Giuseppe Demarco in 1764 in his manuscript "*Tractatus affectuum cutaneorum*" wherein he discusses the development, diagnosis and treatment of *de carbunculo seu anthraxe*.⁷³ In 1852, Dr. Sav. Bardon remarked that *anthraxe* "was a predominant affection in Malta, particularly during summer" and was often fatal when weak individuals were affected. Similar observations were made by Dr. W.H. Burrell who wrote that the presence of carbuncle seems to be an almost constant endemic manifestation in Malta" and that "there is a clear predisposition in the inhabitants of Malta for carbuncle affections and eruptions of a similar kind ranging from the common furuncles of youths to the graver forms occurring in old and sickly persons or those who live in poverty and misery".⁷⁴ By 1872, Maltese practitioners were made aware of the association between carbuncles and diabetes in the local medical journal *Il Barth*.⁷⁵

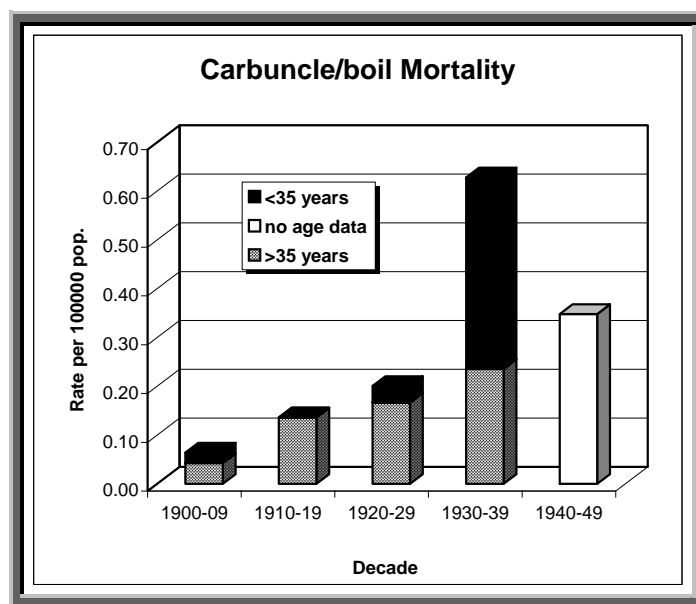
The mortality data pertaining to carbuncles during the first half of the twentieth century suggests a gradual rise in specific mortality figures in persons above the age of 35 years from 0.04 per 100,000 population in the decade 1900-09 to 0.24 per 100,000 in 1930-39. The data is apparently compounded by the inclusion of deaths attributed to skin infections (boils) in both adults and youths.

⁷² C. Savona-Ventura: *An Anthrax epidemic in the Maltese Islands*. It-Tabib tal-Familija, 2002, 22:p.17-19

⁷³ G. Demarco: *Tractatus affectuum cutaneorum*. NML Mss 36 (1764) as reported in P. Cassar, 1982: *op. cit.*, p.10

⁷⁴ W.H. Burrell: *Appendice va al secondo rapporto sulla quarantina. Rapporto sulla pesta di Malta del 1813*. London, 1855, p.24

⁷⁵ C. Borg, 1872: *op. cit.*,p.120-122



In 1938 because of the prevalence, the treatment of surgical complications of diabetes formed a very important part of the Surgical Department. The chief complications were noted by Prof. P.P. Debono to be carbuncles, cellulitis, infections of the musculo-aponeurotic spaces of the hands and feet, and vascular and infective gangrene of the feet. Reliance was placed on early and radical surgery, with carbuncles being opened widely and ensuring effective desloughing. Serum treatment and chemotherapy were found to give disappointing results.⁷⁶ It was only the introduction of effective early treatment of diabetes and antibiotics that carbuncles in Malta became the rarity that they are today.

Blindness: Ophthalmic disease in Malta receives early mention with the first reference dating to the travelogue by Jean Quintin d'Autun written in 1536. However many of the ophthalmic problems mentioned apparently pertained to the infective disease - trachoma - rather than to diabetic complications.

⁷⁶ P.P. Debono: *Annual report on the Health conditions of the Maltese Islands and on the work of the Medical and Health Department for the year 1938*. Malta Government Gazette Suppl., no.CLIV, 29 December 1939, p.xxxi-xxxii

Ophthalmologic problems - loss of vision and cataract formation - were only specifically associated with diabetes in Malta in 1873, the association being mentioned by Dr. P. Sammut and later repeated by Dr. Gavino Gulia in 1874.⁷⁷ It has been suggested that at the beginning of the twentieth century, ophthalmic complications of diabetes may have not been as common as one would expect. The reports by three ophthalmologists working in Malta at the turn of the century make no mention of diabetes in the cases seen. There did appear to be a higher incidence of cataract formation [11.02%] when compared to Rome [5.14%.]⁷⁸ In a 1958 survey conducted on 638 blind individuals, diabetes was found to be the aetiological cause in 92 [15.9%] persons.⁷⁹ Diabetic retinopathy remains a significant morbidity in Maltese diabetics.⁸⁰

Gestational Diabetes: There is no doubt that the introduction of insulin in the management armamentarium in the care of diabetics contributed towards a major significant change in the lifestyle pattern of the female population. Before the introduction of the drug, young diabetic females had a very adverse lifestyle, and those that survived to the age of reproduction had a lowered fertility. Furthermore, if they were able to become pregnant, these women had a disastrous obstetric outcome with a less than 50% chance of having a living child. Insulin therapy, described by F. Banting and C. Best in 1921, was introduced in Malta very soon after its discovery, and after it was commercial produced by pharmaceutical companies. Another type of diabetes that complicates pregnancy is the diabetic state that develops for the first time during the pregnancy. The first significant mention of pregnancy complicating diabetes was made by J.M. Duncan in 1882 in a review describing 22 diabetic pregnancies. He also reported the occurrence of diabetes appearing “only during pregnancy, being absent other

⁷⁷ P. Sammut, 1874: *op. cit.*; *Il Barth*, 6 August 1874: *op. cit.*

⁷⁸ F.J. Damato: *Eye disease in Malta at the turn of the century*. St. Luke's Hospital Gazette, 1973, 8(1):p.53-57

⁷⁹ F.J. Damato: *Incidence and causes of blindness in the Maltese Islands: A survey based on the examination of 638 blind persons*. British Journal of Ophthalmology, 1960, 44:p.164-171; F.J. Damato: *Diabetic retinopathy*. St. Luke's Hospital Gazette, 1976, 11:p.107

⁸⁰ A.G. Schranz and L. Zarabinska: *Retinopathy in Maltese type II diabetic patients*. Diabetic Medicine, 1995, 12:p.441-444

times”⁸¹ The pregnant woman undergoes profound changes in her physiology, sufficient for her to be considered a completely different person. These changes include those that alter the metabolic processes utilised for the breakdown of carbohydrates. The stresses brought on by these pregnancy changes can bring out a diabetic state during pregnancy in those women who are susceptible to eventually developing diabetes later on in life.

Diabetes complicating pregnancy in Malta was first mentioned in 1937 when glycosuria was reported to be one of the most frequent complications of pregnancy accounting for 3.2% of all hospital deliveries that year.⁸² During 1968, pre-existing diabetics accounted for 0.74% of all births occurring at St. Luke’s Hospital; while recognised gestational diabetics accounted for 0.3% of all births.⁸³ The prevalence of pre-existing diabetes during pregnancy should be equivalent to the prevalence of the disorder in the female reproductive age (15-44 years) group. This was estimated by population studies carried out in the early 1980s to approximate 0.5% of women in that age group.⁸⁴ In reality, the prevalence of pre-existing diabetes in the Maltese pregnant population delivering at Karin Grech Hospital in 1983-86 approximated 0.22% of pregnant women.⁸⁵ A higher prevalence rate of 0.35% was demonstrated in the pregnant population delivering during 1999-2002. The majority (75%) of these cases were Type 1 IDDM; while 19% and 5% were cases of NIDDM and IGT.⁸⁶

The incidence of gestational diabetes (i.e. diabetes that develops during pregnancy) in Malta has been estimated by epidemiological studies to approximate 5.9% of total pregnant women, of which 0.7%

⁸¹ J.M. Duncan: *On Puerperal Diabetes*. Transactions of the Obstetrical Society of London, 1882, 24:p.256

⁸² J. Ellul, V. Stillon, S. Mattei, C. Zammit: *Clinical Report of the Maternity & Gynaecological Subdivisions of the Central Hospital, Malta for 1937*. Department of Health, Malta, 1938

⁸³ *St. Luke’s Hospital Maternity Records 1968*, unpublished data [manuscript in the author’s holdings]

⁸⁴ G. Katona et al., 1983: *op. cit*

⁸⁵ C. Savona-Ventura, E.S. Grech: *Abnormal glucose metabolism in the Maltese pregnant population*. *Diabetica Croatica*, 1986, 15-3:p.127-134

⁸⁶ C. Savona-Ventura: *Temporal trends in pregnancy outcome of Maltese Diabetic patients*. *International Journal of Diabetes and Metabolism*, 2004, 12(1/2):p.1-4

refer to relatively severe forms of the disorder.⁸⁷ In reality only about 1.3% of pregnant women were identified as suffering from diabetes during their pregnancy in the mid-1980s. A similarly low rate of 2.4% was noted in women delivering during 1999-2002.⁸⁸ The relatively low rates noted in clinical practice suggest that not all the women who develop diabetes during pregnancy are being identified with the present screening methods. A more active screening mentality needs to be assumed by all medical practitioners and obstetric specialists.

It is essential that all the forms of diabetes which occur during pregnancy are identified and managed correctly since all the different conditions are attendant with a higher perinatal mortality and morbidity. Maternal mortality is not particularly increased. The first recorded maternal death in a diabetic in Malta was reported in 1937. The 35-year old diabetic mother suffered also from albuminuria and chronic myocarditis. She delivered a stillborn child and died in the early postpartum period from heart failure.⁸⁹ The last recorded diabetic maternal death occurred in 1974. This was a 43-year old grand multipara who suffered from diabetes mellitus. Her immediate cause of death was congestive heart failure following postpartum haemorrhage.

Perinatal mortality in diabetic women remains at a higher rate than in the non-diabetics even though modern management has helped reduce the rates of these adverse complications to relatively low levels. Thus the chances of a diabetic mother having a dead infant at the end of her pregnancy in 1979-82 was 6.8 times greater than non-diabetic mothers. This risk factor decreased to 2.1 times in 1983-86. Besides an increased risk of mortality, the infants of diabetic mothers have a greater chance of adverse metabolic settings exemplified by a relatively higher birth weight. The infants of diabetic mothers were in 1983-86 1.7 times more likely to have a birth weight greater than 4 kg when compared to infants of normal mothers.⁹⁰ The higher infant morbidity and mortality remains today in spite of a more aggressive intra-pregnancy management [see table below].

⁸⁷ C. Savona-Ventura: *Annual Report 2001 for the Diabetic Pregnancy Joint Clinic, St. Luke's Teaching Hospital, Malta*. DPJC, Malta, 2002

⁸⁸ C. Savona-Ventura, 2004: *op. cit.*

⁸⁹ J. Ellul et al, 1938: *op. cit.*

⁹⁰ E.S. Grech, C. Savona-Ventura: *The Obstetrics and Gynaecological Service in the Maltese Islands: 1987*. Dept. of Obstetrics & Gynaecology, Malta, 1988

Pregnancy Outcomes	Previousl y diabetic %	Gestation al diabetes %	Non- diabeti c %
<i>Infant Morbidity & Mortality</i>			
Stillbirth & Neonatal deaths	2.91	0.82	0.95
Premature births [<36 weeks]	22.64	11.64	5.16
Large weight infants [>4000 g]	20.75	11.04	5.42
Infants with Respiratory distress	15.09	4.82	2.00
Major congenital anomalies	4.72	1.20	3.16
<i>Maternal Morbidity</i>			
Maternal hypertensive disease	20.41	16.67	6.47

Pregnancy Outcomes: 1999-2004

To further reduce the remaining higher mortality and morbidity of infants of diabetic women, careful management and monitoring throughout the pregnancy are essential. In 1983, the Department of Obstetrics & Gynaecology at Karin Grech Hospital initiated specific interest in Diabetic Pregnancy when the Director of the Department Prof. Edwin S. Grech initiated a Research Multidisciplinary Working Group with the scope of initiating several research projects. The setting up of this Study Group followed the initiation in 1981 of the National Diabetes Programme in Malta in collaboration with the WHO; the Vuk Vrhovac Institute for Diabetes, Endocrinology and Metabolic Disease in Zagreb; and the Ministry of Public Health and Family Affairs of Belgium. This study group participated in various national and European multicentre studies.



To further augment and improve the management of these women, the Department of Obstetrics and Gynaecology at Karin Grech Hospital in 1993 set up a Diabetic Pregnancy Joint Clinic. This was supplemented in 1998 by bringing it under the direction of a Consultant Obstetrician, Dr. Charles Savona-Ventura, who had a special interest and training in the subject. The Clinic in 1999 set up one of the first dedicated Maltese Homepages on

the Internet to help disseminate information about diabetic pregnancies.⁹¹

The management of the pregnant woman with diabetes presents today different challenges than in the past, and necessitates a team effort between the various specialist players in the field including the woman herself. Only by regular attention to the metabolic state of these women and their overall physical health can the complications attending diabetes during pregnancy be reduced to a level envisaged by the St. Vincent Declaration which states that the aims in the management of pregnant diabetics one should strive "To achieve pregnancy outcome in the diabetic woman that approximates that of the non-diabetic woman".

⁹¹ Homepage at Department of Health website
<http://www.sahha.gov.mt/pages.aspx?page=596>