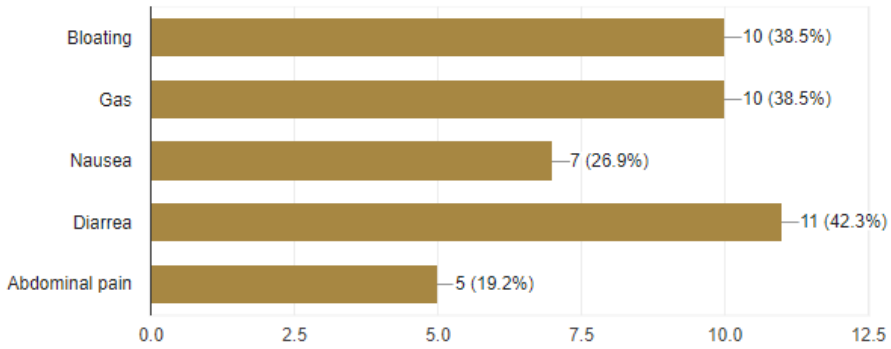

Figure 2 – The symptoms occurrence

When it comes to lactose-rich dairy items, milk (n=103) is the most preferred, followed by your gut (n=97), cheese (n=76), whipped cream (n=21), pudding (n=45), and ice cream (n=87). And the frequency of consumption in the diary shows daily – 55%, 36.7% – sometime, 6.7% – rarely, and 1.7%-not eaten, demonstrating that the majority of people do not have difficulty digesting lactose products and are lactose persistence. However, if a person has LI, the treatment primarily consists of lowering or removing lactose from the diet until the symptoms resolve. As a result, the dietary approach is critical in the management of LI patients, and lactose-free products and supplements are an additional option.83.3% of individuals do not buy lactose-free products, whilst 16.7% do.

Conclusion

The interplay between lactase enzyme production and lactose intolerance is multifaceted and layered. The presence and activity of lactase are crucial for the metabolic processing of lactose, influencing a person's capacity to handle this sugar. Nonetheless, the manifestation of lactose intolerance symptoms can significantly differ among individuals, with contributions from genetic makeup, age, and more. The findings imply that while a predominant number of individuals maintain lactase activity, a minority exhibit a decline, known as lactose non-persistence.

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УДК 616.379-008.64-008.9

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PATHOLOGY OF THE CARBOHYDRATE METABOLISM: DIABETES MELLITUS AND GLYCOGEN STORAGE DISEASES

Introduction

Carbohydrate metabolism disorders occurs when our body is unable to handle the amount of carbohydrates stored or that is lacking in the body. These disorders impact both the breakdown (catabolism) and synthesis (anabolism) of carbohydrates. Thus, giving rise to these pathologies.

Goal

This research focuses on diabetes mellitus and glycogen storage diseases. Their characteristics and clinical significance with carbohydrate metabolism. Furthermore, evaluating the knowledge of such complications and types of diseases among individuals.

Material and methods of research

Diabetes Mellitus – There is type 1 and type 2 diabetes mellitus. Diabetes type 1: it is insulin dependent diabetes mellitus, IDDM, juvenile-onset diabetes (mainly occurs in infants) – this occurs due to the deficiency of insulin. Diabetes type 2: it is noninsulin-dependent diabetes mellitus, NIDDM – this is due to the in ability of tissues (adipose and muscles) to take up glucose in the presence of normal amounts of insulin. The effects of insulin deficiency: Hyperglycaemia (level of sugar in blood is high)-glucosuria (glucose in the urine). Hyperlipidaemia (level of lipids in blood is high) – atherosclerosis (build-up of fats, cholesterol in the walls of the artery). Metabolic acidosis – ketosis (burning of fat instead of glucose), diabetic coma (very high or very low sugar level in blood leas to unconsciousness called diabetic coma) [2, 6]. Secondary effects: Diabetic angiopathy – pathological conditions of blood vessels. Nephropathy – pathological condition of kidney and its abnormal functions. Neuropathy – damage in nervous system. Clinical manifestations – "3p" syndrome – polydipsia – digestion disorder, polyuria – production of urine more than normal amount, polyphagia – difficulty in swallowing [2, 6]. Laboratory diagnostics: Blood glucose level, glucose tolerance test, ketone bodies in blood and urine, glycosylated haemoglobin, insulin, C-peptide [2, 6]. It is necessary to clarify the relationship between body composition, metabolic syndrome, and insulin resistance in T1DM to guide clinical treatment and intervention [7].

Glycogen storage diseases – they are inherited from inborn errors of the carbohydrate metabolism. This mainly occurs due to the lack of breakdown of glycogen [3].

Table 1 – Glycogen storage diseases and about their defective enzymes with clinical features. Concludes their characteristics and manifestations of each type of glycogenosis

Glycogenosis	Name	Defective enzyme	Clinical features
0	—	Glycogen synthase	Hypoglycaemia; hyperketonaemia; early death.
I	Von Gierke disease	Glucose-6-phosphate	Glycogen accumulation in liver and renal tubule cell; hypoglycaemia; lactic acidaemia; ketosis; hyperlipemia [1, 4, 5]
II	Pompe's disease	Lysosomal	Accumulation of glycogen in lysosome. Muscle Hypotonia, muscle dystrophy and death by heart failure by age of 2 [1, 4, 5]
III	Forbe's and Cori's disease	Liver and muscle debranching enzyme	Fasting hypoglycaemia, hepatomegaly in infants, accumulation of branched polysaccharide, muscle weakness [1, 4, 5]
IV	Andersen's disease	Branching enzyme	Hepatosplenomegaly, death from heart or liver failure before age 5 [1, 4, 5]
V	McArdle syndrome	Muscle phosphorylase	Poor exercise tolerance; muscle glycogen abnormally (2.4–4%); blood lactate very low after exercise.
VI	Her's disease	Liver phosphorylase	Hepatomegaly; accumulation of glycogen in liver; mild hypoglycaemia; good prognosis [1, 4, 5]
VII	Tarui disease	Muscle and erythrocyte phosphofructokinase 1	Poor exercise tolerance; muscle glycogen abnormally high (2.5–4%) low level of blood lactate after exercise; also, haemolytic anaemia [1, 4, 5]
VIII	—	Liver phosphorylase kinase	Hepatomegaley; accumulation of glycogen in the liver; mild hypoglycaemia; good prognosis [1, 4, 5]

The results of the research and their discussions

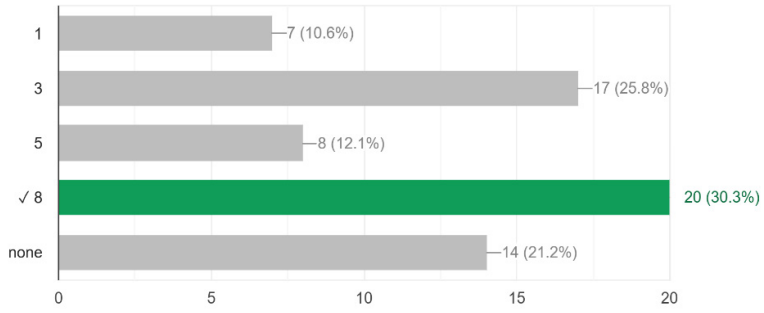

Figure 1 – Statistical graph on the question "how many types of glycogen storage disease do you know?"

A survey was conducted among 66 individuals, from different age group (10–15, 16–18, 19–25, 26–35,36–44, 45 and above) and results were obtained. From Gomel – Gomel State Medical University, Grodno – Grodno State Medical University, India – Avinashilingam Institute for Home Science and Higher Education for Women. Participants knowledge of carbohydrate metabolism disorder is about 44 (66.7%) and from the age (16–25), around 50 (75.8%) participants were students from medical and biochemistry department. In the questionnaire, questions about the disorder that occurs due to carbohydrate metabolism were enquired and their response was around 60–70% satisfactory, approximately only 63% of their responses showed their knowledge about these diseases. Such as lactose intolerance – 47 (70.1%), diabetes mellitus – 61 (91%), fructose intolerance – 35 (52.2%), pentosuria – 30 (44.8%), galactosemia – 44 (65.7%), renal glycosuria – 39 (58.2%). For the 9th question in figure 1, it is noticed that not many people are aware about glycogen storage diseases, because only 20 (29.9%) participants were able to identify how many types were mainly present. When individually asked about which type was those certain diseases, these were the responses – Andersen's disease – type IV – 46 (68.7%), Her's disease – type VI – 36 (53.7%), Tarui disease – type VII – 40 (59.7%). Only around 60.7% were able to identify those glycogen storage disorders and then figure 2, the 3rd question was to understand if the participants were aware of the disease which is diabetes mellitus as it was a major disorder of the carbohydrate metabolism and around 61 out 66 (92.4%) participants knew about diabetes mellitus.

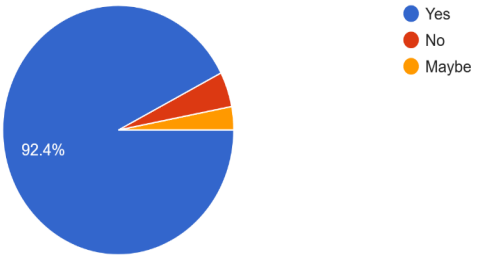

Figure 2 – Pie chart presentation of how many of the participants knew about diabetes mellitus

A question regarding about the types of diabetes mellitus was raised they were asked to select 2 answers and their response to how many types of diabetes mellitus are there shows for – type 1 – 34 (50.7%) and for type 2 – 54 (80.6%). These were the results obtained from the survey conducted.

Conclusions

From the results of the survey obtained, it can be concluded that not many people are aware of glycogen storage diseases. Though people are aware about diabetes mellitus, there are other diseases that are related to the metabolism of carbohydrate that are not considered. Not many acknowledge the fact of the types of diabetes and types of glycogen storage diseases. People know more about type 2 diabetes rather than type 1 diabetes mellitus. Further studies are needed to be done on the awareness on the pathology of carbohydrate metabolism and to help spread this knowledge to all study institutes.

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УДК 577.125:[577.121+576.311.347]

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LIPID METABOLISM IN MITOCHONDRIAL AND METABOLIC DISEASES

Introduction

Metabolic diseases, such as obesity and type 2 diabetes, are prevalent across all age groups, with lipid metabolism playing a key role in their development. [2]. Mitochondria, the cellular powerhouses responsible for generating energy, are crucial for maintaining energy balance in metabolic tissues. [6]. Adipose tissue, comprising white (WAT) and brown (BAT) types, stores and expends energy, respectively. [6]. Mitochondrial dysfunction in adipocytes has been linked to obesity and type 2 diabetes, highlighting the importance of mitochondrial health in preventing metabolic disorders. [6]. By regulating mitochondrial biogenesis and dynamics in adipocytes, it is possible to mitigate the risk of obesity and associated conditions. Mitochondria play a vital role in metabolism by converting food into energy, producing essential molecules, and maintaining redox equilibrium. reactive oxygen species, highly reactive molecules, can contribute to cellular damage and the development of metabolic disorders when produced excessively [5].

Goal

To investigate the regulation of mitochondrial function in order to develop treatments for lipid metabolic diseases. The study aims to identify physiological and biochemical factors that contribute to these conditions.