Type 2 Diabetes And Parasite

Parasitosis affects a huge number of the world population. Both urogenital and IPIs are linked to increasing morbidity, mortality, and serious outcomes [10-22]. Intestinal parasitosis greatly affects body metabolism, nutrition absorption and gut ecosystem [26-28]. A complex relationship exists between parasitosis and T2DM. The mechanisms of both suggest they affect each other. The current study findings indicated that the proportion of parasitosis, in particular, urogenital Schistosomiasis and intestinal parasitic infections were higher in T2DM compared with healthy individuals. As well, the odds of developing either urogenital Schistosomiasis or IPIs are at least two times higher in T2DM. Besides some recent studies [29,30] have found that intestinal parasitic infections are linked to T2DM; non-significantly dissimilar frequencies of diseases among socio-demographic factors in this study have greatly strengthened the relation. In contrast, some scholars[31,32] had found that diabetes mellitus (T1DM and T2DM) patients had a lower probability for intestinal parasitosis. This could be due to the fact that T1DM had a lower frequency of intestinal parasitosis compared to T2DM, which could affect the prevelance rate [33,34]. In addition, non-matched study designs for socio-demographic factors such as age and gender might be implicated, as they are well-known factors affecting the diabetic status and parasitic infection. Since the findings of Tangi FB [31] and Nazligul Y [32] studies are unable to apply for T2DM inorder to determine the causality of the association, the results of this study confirmed the link between T2DM and parasitosis, which could be attributed to the generalized immunity weakness, and gut microbiota changes.

With regard to socio-demographic factors: besides almost the prevalence of urogenital Schistosomiasis and intestinal parasitosis are higher in T2DM; males, adult, rural area residents, business and employed, and unmarried participants are generally linked to parasitosis (AOR>1). In addition, Farmers and drivers are commonly associated with high risk for urogenital Schistosomiasis. Previous studies also have documented similar findings [33,35,36,29,37, 38]. The considerable frequency of parasitosis in these groups might be clarified, at least partially, by a fact that job environments and lifestyle influence males especially the adult peoples, as they are in continues interaction with these factors compared to females and elders. Other reasons are that the rural areas suffered from infrastructures and health serves deficiency, in addition to the lack of the proper source of water, which could reflect the explanations for the higher prevalence in this area compared with urban regions. Likewise, the low education levels (no formal or primary school education) and the uses of unpurified river or hafir water are linked with increased risk for urogenital Schistosomiasis and intestinal parasitic infections. Inconsistent with the earlier studies reports [8, 35, 38]; the low education levels and unpurified water could increase the probability of infection and health disorders. Therfore, these findings might suggest that urbanization and the aviabaliabilty of a purified source of water supply together with various improvements due to education and socioeconomic development could help to decline the prevalence of urogenital Schistosomiasis and intestinal parasitosis.

Regionally, the distribution of urogenital and intestinal parasites is influenced by multiple factors including the environment and geographic location, which make persons at higher risk for particular parasites or indirectly affect the parasite survival and transmission. S.haematobium, S.mansoni, H.nana, Cryptosporidium spp, and E.histolytica compromised the identified

parasites, with significantly higher frequencies and eggs intensities in T2DM. In agreement with previous studies [34, 29-31], those parasites are most frequently in individuals with T2DM. The considerable variability in the susceptibility and intensity of parasite infections between the two communities might be related to the reduction in immunity response to those pathogens, gut ecosystem changes and socio-demographic influences.

Concerning the relation of the duration of T2DM and parasitic infection, the current study reported that the rate of parasitic infections, in particular, intestinal parasitosis is significantly increased with the duration of type 2 diabetes, as well parasite intensities were positively correlated with the duration of illness. The probable reason for this variation in the susceptibility to infection and intensities of parasite could be related to the effect of short and long-term consequences together with the influence of the weak immunological status of T2DM individuals and gut microbiota alteration. The higher frequency of parasitosis in relation to the duration of T2DM as seen in the current study could strength the link between T2DM and parasitic infections.

The body usually derives glucose from carbohydrates. After meals, carbohydrate metabolism exactly takes place in the digestive tract where they are converted into glucose and absorbed into blood [39,40]. Gut microbiota plays a significant role in carbohydrates metabolism, glucose absorption, and blood glucose hemostasis [40]. The release of glucose into the circulation also resulted from the breakdown of stored glycogen in the liver [41]. Blood glucose is controlled by a set of metabolic hormones. Insulin is a key anabolic hormone; through its action on the insulin receptor decreases blood sugar levels by increasing glucose uptake; stimulating the lipogenesis, glycogenesis, and storage of glycogen; and inhibition of glycogenolysis, lipolysis, and breakdown of protein [42,43]. As seen in this study, light asymptomatic urogenital Schistosomiasis and intestinal helminthiasis were greatly reduced the mean blood glucose level in compared to non-infected individuals, whereas Cryptosporidiosis and mixed infections were linked to higher blood glucose levels. Recently published animal studies have also shown that intestinal helminthiasis reduced blood glucose concentrations and improve insulin sensitivity. [44-48]. However, the exact mechanisms are not fully understood, the improved blood glucose possibly might be due to increased insulin sensitivity. This may be explained by the fact that helminthiasis lowers the circulating levels of pro-inflammatory cytokines and higher the levels of anti-inflammatory cytokines [47,48]. Besides, the anti-inflammatory properties of worms, helminths cause depletion of body energy sources resulting in weight loss and improved metabolic outcomes [47]. As well, it greatly manipulates the gut microbiome [49], which plays an essential role in blood glucose hemostasis. Nevertheless, these results provide new evidence concerning the relationship between T2DM and intestinal parasitic infection, whether such parasites, microbiota, and host interaction can improve blood glucose is remains questionable.

Conclusion

There was a significant association between T2DM and parasitic infections, in particular, urogenital Schistosomiasis and intestinal parasitic infections. The duration of T2DM significantly increases the vulnerability to parasitic illnesses. Inconsistent with this study finding, light asymptomatic urogenital Schistosomiasis and intestinal helminthiasis improve blood glucose level. Therefore, these results provided evidence that searching about the mechanisms underlying helminthiasis and blood glucose relation could facilitate the development of new strategies to control hyperglycemia state in T2DM.