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Iron Bisglycinate Chelate (Ferrochel) and Strength / Power Development in Powerlifting Players of Pakistan

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ABSTRACT

Aims of the Study: Iron is one of the most important components of a person's life, but there is no physiologic system that regulates the secretion of iron; nearly all people control their iron absorption alone. Ferrochel i.e., Iron bisglycinate, a form of iron that is chelated and has better effects, tolerance, and uptake than other iron salts. This study is concerned with effect of Ferrochel on strength development of Powerlifters of Pakistan.

Research Methodology: Pre-test Post-test quantitative method was used in which experimental group (n=40) having dose of Ferrochel is compared with Control group (n=40) and change in lifting best total (Kgs) of Powerlifting events and blood hemoglobin level (g/dL).

Results: It was observed that players having Ferrochel have a significant increase in their mean lifting best total (34.32Kg) and blood hemoglobin level (4.67 g/dL) as compared to controlled group which is 4.97Kgs in lifting best total and 0.69g/dL in blood hemoglobin level.

Conclusion: It was concluded that players having Ferrochel have performance in their lifting best total due to use of Ferrochel as compared to control group which means there is positive effect of Ferrochel in strength of Powerlifters from Pakistan.

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Introduction

Iron is a non-negotiable requirement for nearly all living things, including humans, animals and plants as iron found in a wide variety of foodstuff resources contain iron (Whitney & Rolfes, 2015). Iron is one of the most important components of a person's life, but there is no physiologic system that regulates the secretion of iron; almost all people manage their iron requirement from external sources (Drakesmith & Prentice, 2012). Iron poisoning begins to overwhelm the body's ability to attach and accumulate, leading to iron toxicity and its associated Iron toxicity syndromes in those who cannot adequately control absorption (Muñoz, García-Erce & Remacha, 2011). Iron deficiency (ID) is a predominant wholesome

worry among the athletic populace because of the expanded iron demand of this community (Mattiello et al., 2020). Players' capacity to renew burdened iron stores is trying because of the association among utilized iron and hepcidin, the essential iron-administrative chemical (McCormick, 2020). Iron deficiency (ID) is viewed as a range that advances because of negative iron equilibrium (Peeling, McKay & Sim, 2022). Compromised iron status is regularly connected with exemplary side effects of laziness and weariness; in any case, in competitors, the issue might appear in decreased work limit, lessened preparing and execution results, or a smothered ability to answer/adjust to preparing competition pressure, especially as the condition advances in seriousness (McCormick et al., 2020). Competitors are possibly more helpless to ID due to; (a) Hematological variation to different doses, which forces more noteworthy interest on oxygen transport instruments; and (b) Openness to iron disaster conditions during exercise, like perspiring, haematuria, and gastrointestinal (GI) death / disorder, which however apparently irrelevant, may aggregately influence iron status after some time (Bahr & Holme, 2003). This is particularly pertinent to world class competition sports populaces who participate in various national and international events, Iron cannot be endogenously orchestrated by the body, competitors are expected to supplant these expanded iron deficiencies through satisfactory iron admission and ingestion, which is subsequently, basic to keeping a sound iron maintenance (Sim et al., 2019). In comparison to other Iron supplements, Ferrochel, also known as iron bisglycinate, is a chelated form of iron that is more absorbable, palatable, and effective than other iron salts. Ferrochel uptake into the body, like that of other chelates, is adaptable to meet the body's needs, preventing iron deficiency or overdose as well as competing interactions with other minerals and fiber (Vasconcelos & Valzachi Rocha Maluf, 2018). Powerlifting is a power sport that contains 3 classes at greatest power on 3 lifts in the request for squat, seat press and deadlift, generally Powerlifting created from a game perceived as Odd Lifts, its organization additionally comprised of three attempts, however it incorporates a more extensive scope of occasions, in like manner to strongman challenge, eventually Odd Lifts transformed into indistinguishable from the momentum three (Butt, Akhtar, Rashid, Saeed & Adnan, 2015).

Literature Review

A nutrient that is necessary for the body to function normally is called a vital nutrient. It may not be fabricated in that frame of mind using any and all means or cannot be delivered in that frame of mind for better wellbeing (Aostoni et al., 2010). The combined physiological evidence of their importance in nutrition may also be used to describe indispensable nutrients (Witkamp, 2021). Iron is a non-negotiable requirement for nearly all living things, including humans and the majority of bacterial groups; both animals and plants use iron; Consequently, a wide variety of food sources contain iron to meet the body requirement (Massey, 2002). Because of its remarkable flexibility to serve as both an electron acceptor and donor, iron is essential for life. The body of a human being requires iron to transport oxygen, and oxygen is necessary for the creation and continued existence of nearly all of a person's cells (with the exception of mature erythrocytes, whose bodies regulate iron assimilation and reprocessing) (Mazari et al., 2021). Iron is one of the most important parts of a person's life, but there is no physiologic system that regulates the secretion of iron; almost all people manage their iron requirement from external sources (Lakhal-Littleton et al., 2015). Iron poisoning begins to overwhelm the body's ability to attach and accumulate, leading to iron excess and leading to iron toxicity in those who cannot adequately control absorption (Muñoz, García-Erce & Remacha, 2011).

The hepcidin reaction has overwhelmingly been concentrated on in perseverance exercises, however has additionally been affirmed in team events activities (more suggestive of group activities) and all the more as of late, following contact sports activities (Burden et al., 2015). This exploration reliably uncovers huge increments (2-7-overlap) in hepcidin 3 hours following activity, impacted transcendently by the span of activity, the pre-practice / pre-test serum hemoglobin focuses and the post-practice / post-test articulation of IL-6, rather than the particular activity type (Fletcher et al., 2017). This peculiarity as of late provoked to explore the intense impact of activity on iron retention, especially during the quick post-practice results, preceding the pinnacle increase in hepcidin levels. Thus, specialists inspected the impact

of a 90 min run, led in the first part of the day or evening, on iron retention from both a morning meal and supper dinner, by means of detectable iron isotopes (Bezkorovainy, 2012). These results show that exercise might conjure a momentary open door for iron retention in the first part of the day; while in the early evening, more noteworthy expansions in hepcidin fixations, in relationship with the diurnal increment of hepcidin, seem to nullify this expected beneficial outcome (Kroot, Tjalsma, Fleming & Swinkels, 2011). This intense connection among weight training and iron retention demonstrates that it could be more vital for competitors helpless against ID to devour most of their everyday iron administration in 30 min of morning activity to expand how much iron they ingest. Obviously, the iron admission during this period might get from decisively chosen food sources, or as iron enhancements (Mandova et al., 2019).

The most examinations investigating iron use in competitor populaces have utilized ferrous salts (Elli et al., 2018). In any case, ferrous fumarate likewise shows positive results on iron stores in competitors, with retention energy like ferrous sulfate (Khalafallah & Dennis, 2012). To enhance oral Iron absorption, some additional contents like L-Ascorbic Acid added along with Iron supplement to promote Iron absorption as it promotes Iron bioavailability (Johnson-Wimbley & Graham, 2011). Notwithstanding, while oral iron enhancements made out of ferrous sulfate are right now the most widely recognized type of cure for ID, their utilization is basically restricted by much of the time announced gastrointestinal (GI) incidental effects, including side effects like torment, sickness, spewing, stomach trouble/totality, blockage and looseness of the bowels (Girelli et al., 2018). Since oral iron supplementation requires moderately long haul responsibility (4-12 weeks), such aftereffects can prompt resistance, possibly delivering the treatment less powerful (Ullah et al., 2018). Regardless of practically identical paces of GI aftereffects, adherence rates give off an impression of being higher (>80%) among competitor populaces, possible an impression of their inspiration to upgrade their actual presentation (Daneshmend et al., 1992). For instance, in a competitor explicit review, 6 out of 14 sprinters recorded encountering GI trouble while enhancing everyday with ferrous sulfate (identical to 105mg of essential iron) (Crane & Temple, 2015). In any case, such iron enhancement related complexities would without a doubt hinder sports training consistency through the related GI trouble. Accordingly, research proceeds to attempt to build the adequacy of this type of treatment, distinguishing elective systems, for example, galenic definitions, and all the more as of late, the timing and dose of iron admission, which we will investigate further underneath (Bardes, 2014). The Iron bisglycinate chelate (Fe-Ron, 26 mg essential iron) is profoundly steady and promptly bioavailable, with late examinations exhibiting decreased GI trouble in relationship with a 4-5 times more prominent retention rate as contrasted and ferrous sulfate within the sight of human (McGee & Diosady, 2018).

As this study is concerned with the effect of Ferrochel on Powerlifting Players because Powerlifting sports is concerned with strength and power and blood haemoglobin level is one of the parameters to increasing strength and power of muscles by increasing their lean mass, increasing in myoglobin protein and increase in serum ferritin level and there is no such type of study done before on Pakistani Powerlifting Players. This study is helpful to Powerlifting players to improve their lifting best total for better performance in Powerlifting Sport by managing their blood hemoglobin at optimum level. All strength sports players can get benefit from this study in their professional sports activities. As this study was done first time on the Pakistani population which is an addition to the existing body of knowledge for strength sports players and pharmaceutical manufacturing industries of Pakistan for strength sports-related food supplements development. As this study was done in Experimental (Pre-test Post-test analysis) pattern with the research objective to measure the effect of Iron Bisglycinate Chelate (Ferrochel) on strength development of Powerlifting players of Pakistan which generated the research questions that what is the effect of Ferrochel on strength of Powerlifters of Pakistan as strength is the parameter which can be measured through liftng best total (Kgs) of player. In context to that and with support of previous research, researcher hypothesized that there is positive effect of Ferrochel supplementation on blood hemoglobin level as well as lifting best total (Kgs) of Powerlifting players of Pakistan in experimental group as compared to control group. Researchers measured this effect by measuring change in lifting best

total (Kgs) and blood hemoglobin level (gm/dL) of experimental and control group of selected samples of Powerlifters.

Research Methodology / Experimental Design

A. Elite class male powerlifters (n=80) of age between 20 - 25 years and with body weights from 67 to 93kg (As the majority of Pakistani Powerlifters fall in these body weights) were selected from different weightlifting, powerlifting and bodybuilding clubs in Lahore, Gujranwala, Sialkot, Faisalabad and Quetta (As most of the weightlifting and powerlifting players found in these cities of Pakistan) using convenience sampling. All players were monitored through their native coaches and a regular weekly visit by researchers.

B. The blood haemoglobin level (g/dL) of all players were checked using Bio Vision Abcam® Haemoglobin Assay Kit (Colorimetric) (Kit. No. ab234046) through the colorimetric detection method (Wang et al., 2021).

C. Lifting the best total (Kg) of all players was measured in the pre-test protocol.

D. All players were divided into Group A (n=40) and Group B (n=40).

E. Group A was declared as experimental group which was treated with Iron bisglycinate (Fe-Ron, A product manufactured by Tehseen Laboratories (Pvt.) Ltd. and marketed by Nisma Pharmaceuticals (Pvt.) Ltd.) containing 130mg of protein chelated Iron (Iron bisglycinate chelate) equal to 26mg of elemental Iron for two months under the direction of a registered medical practitioner, a pharmacist, and other paramedical staff, taking one capsule daily (Hinton & Sinclair, 2007).

F. Group B (n=40) was declared as Control Group which was treated with Placebo.

G. A seven days generalized (for all players) game-specific training program for Powerlifting was developed and applied according to their lifting best total (Kgs) for a period of two months with the repetition of eight times in two months on both Group A and Group B.

H. After two months of treatment, a post-test of the best lifting total (Kg) of Powerlifters was taken along with their blood hemoglobin level (g/dL) of both experimental and control group.

I. A comparison of their mean was done using sample t-test for change in their blood hemoglobin level (g/dL) and lifting best total (Kgs) in pre-test and post-test and expression of result was given through table and graphs.

Data Analysis and Results

There was an increase in mean blood hemoglobin level (g/dL) and mean lifting best total / 1 repetition maximum (1RM) of Squat, Bench Press, and Deadlift after the participants were exposed to a two-month training program and supplemented with Fe-Ron (Iron Bisglycinate). Participants in Group A who received Fe-Ron treatment had varying levels of both 1RM total and Blood Hemoglobin Level. The average increase in Group A's mean lifting best total / 1RM of Squat, Bench Press, and Deadlift was 34.32 kg, and the average increase in Group A's Blood Hemoglobin Level was 4.67 g/dL (Table 1, Figure 1 & 2). Participants in Group B who were administered placebo also experienced a slight increase in their Blood Hemoglobin Level. The average increase in Group B participants' 1RM for all three Powerlifting events was just 4.97 kg, and the average increase in Group B participants' blood hemoglobin level was just 0.69 g/dL (Table 1, Figure 1 & 2).

Table 1: *Paired Samples Statistics for Blood Hemoglobin Level (g/dL) and Lifting Best Total (Kgs)*

Measurement Parameters	Pre-test (n=80)	Post-Test		SD	SEM	T	Sig.
		Experimental Group (n=40)	Control Group (n=40)				
Mean Blood Hemoglobin Level (g/dL)	11.36	16.03	12.05	1.8523	0.1156	1.8905	.000
Mean Lifting best total (Kgs)	682.30	716.62	687.27	9.7648	0.7392	1.6292	.000

Where α=.001; n= Sample Population; Sig.=Significance; t=t-test value; SD=Standard Deviation; SEM=Standard Error of Mean

Figure 1: *Comparison of the Results between the Control (Group B) and Experimental (Group A) Groups*

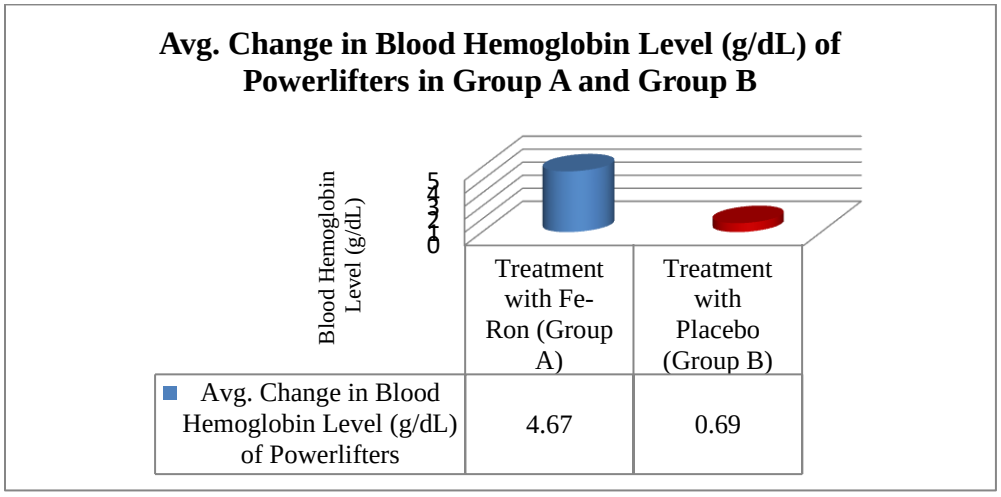
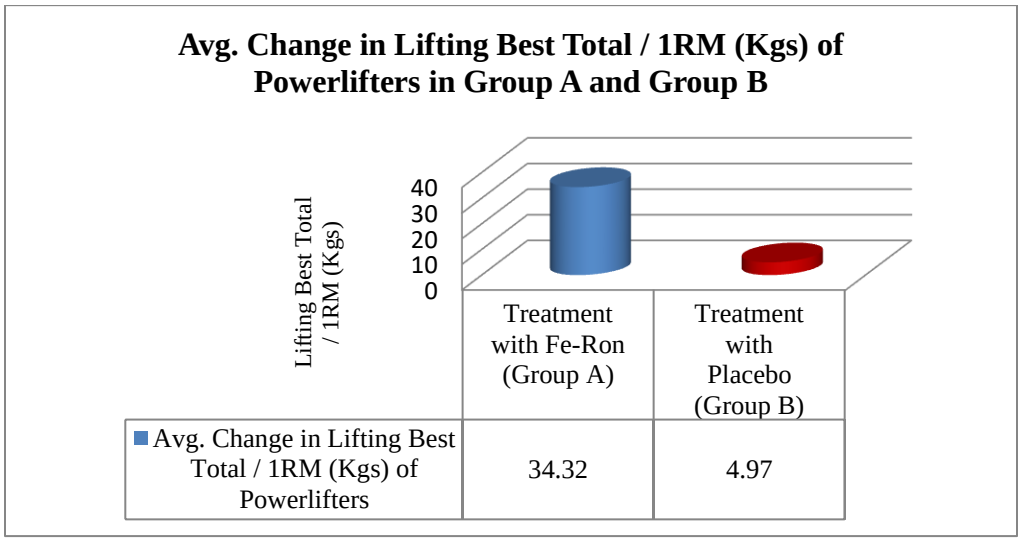


Figure 2



Discussion

Powerlifting relies heavily on power production. Powerlifters' and coaches' capacity enhancement, modification, and evaluation receive significant attention. The connection between work out, hepcidin, and iron retention is an exceptional, yet major test experienced by Powerlifting players, which probably impacts their capacity to recharge burdened iron stores through diet or oral iron supplementation. Likewise, ongoing examination has explored different techniques of oral iron supplementation, determined to increment partial iron retention, lessening gastric disturbance, and at last working on the adequacy of oral iron treatment in Powerlifters (Eid, Arab & Greenwood, 2017). In particular, following a high portion oral iron enhancement, hepcidin remains essentially raised 24 hours(h) following its ingestion, bringing about an extensive decrease in fragmentary iron retention.

Pertaining to this study, positive effect of Ferrochel was found on blood hemoglobin level (g/dL) and lifting best total (Kgs) of Powerlifting players of Pakistan which made hypothises of the study as null hypotheses as Iron assimilation, and hence, the adequacy of oral iron supplementation, is intrinsically represented by hepcidin and its directing controllers (Cocco, 2018). The absence of assimilation in the stomach could underlie the negative gastrointestinal aftereffects related with iron supplementation, considering that the recurrence of these unfriendly side effects connects with the convergence of ionized iron inside the digestive lumen (Sandoval et al., 2018). Notwithstanding the previously mentioned drug details, contemporary examination is as of now researching the ideal dose and timing methodologies of oral iron supplementation, determined to increment fragmentary iron ingestion, lessening gastric bothering, and at last working on the adequacy of oral iron treatment (Levina, Crans & Lay, 2017). This group of examination sustains oral iron treatment/supplementation in Strength Sports Players (except if serious cases require parenteral iron rout), since additional progressions in elective harmless medicines are as yet expected before the possibility of transdermal rout of iron is a reasonable procedure for application (Hinton, 2014). By and large, we presume that a contemporary technique of oral iron treatment to help Powerlifters involves oral supplementation of protein chelated Iron, in a perfect world inside the 30 min following activity, and in players with stomach responsiveness, consumed on substitute days or at lower dosages (Alekel, 1993).

Conclusion

When compared to players who were given a placebo and followed a similar training regimen, those who were supplemented with Iron Bisglycinate had an elevated hemoglobin level and lifted their best total or 1RM at both Powerlifting events, confirming the hypothesis as null hypothesis. Therefore, the use of iron supplements is appropriate for hemoglobin deficiency or normal, but at the equivalency level, athletes cause an increase in their ferritin level, which is a factor in more deposition in muscles, facilitating faster muscle repair, and this led to an increase in Powerlifting players' lifting ability, as demonstrated by the findings of this study. The goal of this study was to find out how Iron Bisglycinate supplementation improved muscle strength and power in non-anemic trained Powerlifting athletes with poor blood hemoglobin absorption. Additionally, in addition to Powerlifting athletes with normal blood hemoglobin levels, research on young athletes in both situations with deficient blood hemoglobin is required to validate the influence of Ferrochel (Iron Bisglycinate). To determine the volume, intensity, and type of workout that is nominally required to produce an effect, additional research is required to examine the effectiveness of various resistance training methods.

Future Recommendation

The current study only includes male Powerlifting athletes on a very small scale which should be done on larger scale and on female players as well of different weight and age groups to generalize it.

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Conflict of Interest

Authors declared no conflict of interest.

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